SPECTRA
WATERMACHINES™

CATALINA 300 DELUXE INSTALLATION & OWNER'S MANUAL

Spectra Watermakers, Inc.
20 Mariposa Road, San Rafael, CA 94901
Phone 415-526-2780 Fax 415-526-2787
E-mail: spectra@spectrawatermakers.com
www.spectrawatermakers.com
10/21/05
NON-MPC VERSION

Thank you for your purchase of a Spectra Catalina system. Properly installed it will provide years of trouble free service. Please pay attention to the installation instructions and the system layout. Like any piece of mechanical equipment the system will require inspection and service from time to time. Do not place the components in inaccessible areas that will prevent proper maintenance. If you are having a dealer install the system for you, review the location of the components to make sure that the installation will meet your approval upon completion.

Catalina Installation Quick Start

Important Details for Installer

1. The system must have a dedicated sea water inlet to guarantee a flow of water, **FREE OF AIR BUBBLES**, to the system. The inlet should be as low in the boat as possible and with a scoop type forward facing thru-hull fitting installed.

2. Both the Catalina Mag Drive Feed pump module and the Clark pump/Membrane module must be installed in a well ventilated compartment where **temperatures will not exceed 120F (48C).** Many engine compartments exceed this temperature when underway. Warranty will be void if the installation does not meet this requirement.

3. Follow the wire gauge charts in the instructions! Using larger wire than specified is acceptable.

4. To achieve the full benefits of the fresh water flush system, the domestic fresh water pressure must be on and the fresh water tank level maintained. Calculate 3 gallons (12L) per flush.

5. If you are separating the Clark pump/membrane assembly, please review the high pressure tube assembly instructions. Improper assembly will cause failure!

6. Run test, then “sea trial” the complete system before assuming the system is operational. If the boat is in fresh or dirty water, see “Dry testing the system.”

7. Spectra dealers are responsible for educating the vessel owners on the operation and maintenance of the system. Please arrange for a “walk through” of the installation between the owner and dealer.

8. Because the one year Warranty begins when the unit is first installed or, for new vessels, when the boat is launched, and the Clark Pump is guaranteed for as long as the original owner has it, it is important to fill out the warranty card, naming the owner and the date of installation.

Table of Contents

Installation

Page Number

Getting Started 7
Installation Basics 8
Component Placement 9
Plumbing 11
Parker Tube Fitting Assembly Procedure 15
Membrane Pressure Vessel Relocation 16
Spectra High Pressure Tube Fitting Assembly 17
Wiring 18
Wiring Diagram 20
Z-Brane Installation 39

Operation

New Systems Start Up and Testing 21
Dry Testing 22
Adjust Fresh Water Flush Cycle 23
Normal Operation 25
Manual Operation 25
Maintenance 26
Bulletins 33

Service & Maintenance

Long Term Storage Procedures 27
Winterizing 29
Membrane Cleaning 30
Suggested Spares 32
Parts Breakdown for all Catalina Deluxe Cystems 42

Getting Started

Unpack the system and inspect it to make sure that it has not been damaged in shipment.

Refer to the shipping list for your system to make sure you have received all of the components listed. Do not discard any packaging until you have found and identified all of the parts. The small installation parts are listed on the Installation Kit pick list.

Spectra Watermakers will not be held responsible for shortages and or freight damage that are not reported within thirty days of the ship date.

Next, study the system layout diagram, component photos and descriptions before beginning your installation. This will assist you in understanding the function of each component.

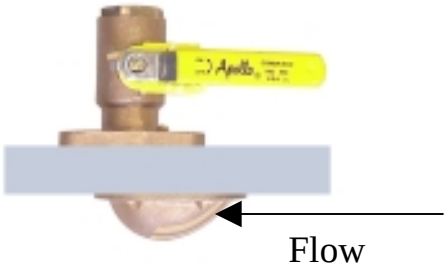
Layout the system. Before starting the installation identify the location where each module and component will be placed. Insure that there is proper clearance around the components for removal of filters and system service. Also check to make sure you have adequate tubing and hose before starting so additional parts may be ordered. Check to see that the control cable is long enough to reach from the display location to the main module.

Catalina Deluxe shipping list:

- Catalina Magnetic Drive Feed Pump Module
- High Pressure Clark Pump and Reverse Osmosis Membrane Module
- Fresh Water Flush Module
- Dual Filter Assembly
- Catalina Installation Kit
- Accumulator / Gauge Assembly
- Service Hose Kit
- 5/8” Hose (25’)
- 3/4” Suction Hose (25’)

Installation Basics

Thru-hull
(Not Supplied).



- **Read the directions!**
- Avoid tight hose bends and excessive runs.
- Use heavy gauge wire.
- Install feed pump as low as possible.
- Use a dedicated thru-hull with scoop type strainer.

Thru-hulls

It is mandatory that a dedicated 3/4" to 1" forward facing scoop type intake thru-hull and seacock be installed. Install the intake for the system close to the middle and as far below the water line as possible. Thru-hulls near the bow and stern are susceptible to air intake in rough conditions. Sharing a thru-hull with another system is not acceptable and will void the warranty. Sharing a thru-hull can introduce unforeseen problems such as intermittent flow restriction, air bubbles, and contaminates. For racing boats and high speed power boats above 15 knots a retractable snorkel-type thru-hull fitting is preferred to be able to pick up water away from the hull.

Do not install the intake close to or downstream of a head discharge. Install as far below the waterline and as close to center line as possible to avoid contamination and air induction.

The brine discharge thru-hull should be mounted above the waterline, in or just above the boot stripe to minimize water lift.

Double clamp all hose connections below the waterline.

Pipe Fitting Instruction

Plastic to plastic fittings should have 3 to 4 wraps of Teflon tape and will thread almost all the way in.

Avoid getting dirt or debris into the piping or hoses during assembly. A small bit of debris can stop the system! Avoid getting tape over the end of fittings that might get into the system. To insure this does not happen, leave the very first thread uncoated.

Avoid restrictions or long runs on the entire inlet side of the plumbing from the thru-hull to the main feed pump module.

Prevent tight bends and excessive elbows. Any restrictions will hamper system performance. Secure the piping away from moving objects such as engine belts and hatches. Prevent chafe on the tubing as required. Test and inspect all piping and hose clamps after several hours of operation.

Wiring

- Pay attention to wire size or system performance will be impaired.
- Perform wiring to UL, ABYC, CE or applicable standards.

Component Placement

Refer to the Plumbing Diagrams

Sea Strainer

Mount the strainer in an accessible area close to the intake through-hull that can handle water spillage during service. Extra care during assembly must be taken to avoid air leaks from the strainer. Use the supplied “Quick Block” cradle and wire tie for mounting.

Fresh Water Flush Module

The fresh water flush module should be located between the intake strainer and the feed pump Module and as low as possible in the vessel. It should be mounted with the filter housings vertical and accessible for changing filters. Allow 2” below the filter housing for removal. Do not install over electrical equipment. Remove filter bowls for access to the screw holes in the mounting plate. The unit contains a 50 Micron prefilter, charcoal filter for the flush water, flush solenoid and three way intake service valve.

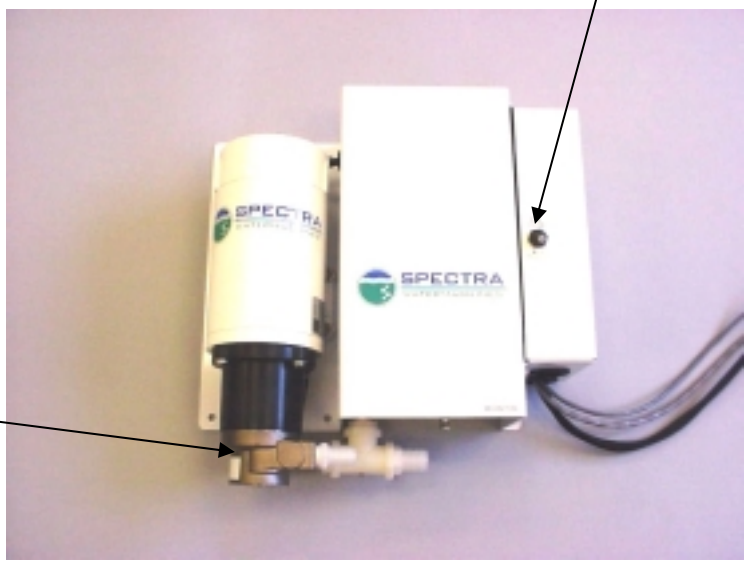
Optional Z–Brane

The optional Z-Brane Water treatment system is permanently installed in the membrane pressure vessels and continuously helps prevent biogrowth and fouling of the membrane system.

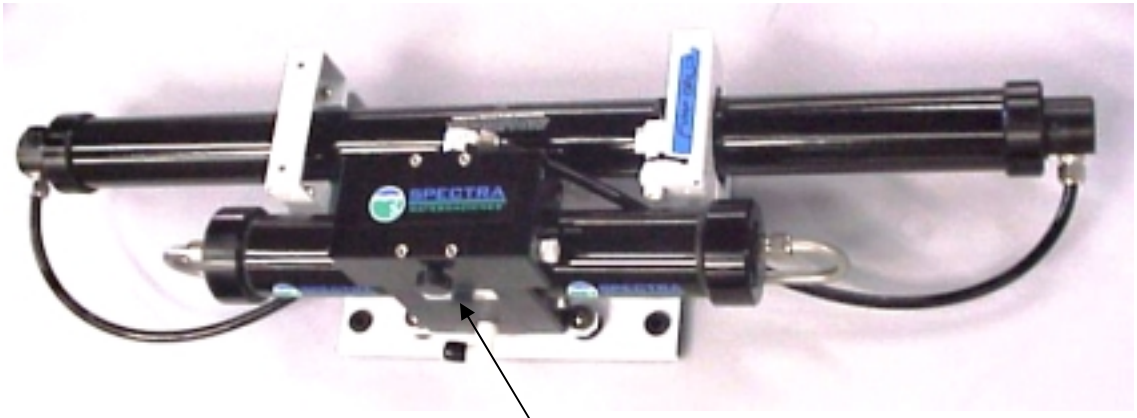
Feed Pump/Main Module

Mount the feed pump/main module on a horizontal or vertical surface that can be up to 3’ (1.0M) above the waterline. It is <u>preferable</u> to mount it as low as possible. Choose a location which will allow access to the manual switch for maintenance procedures. The feed pump will not operate properly at ambient temperatures over 120F (48C).

The feed pump will be damaged or destroyed if allowed to run dry. Always ensure that there is water flow when the pump is running.



Clark Pump/Membrane Module



The Clark pump/membrane module comes complete with a mounting system. Be sure to use the supplied washers on the rubber feet. Use it as a template for drilling the mount holes. Mount in any position but leave access to the pressure relief valve on the Clark pump. The membrane maximum temperature specification is 120F. This module must be installed in an area that maintains a temperature below 120ºF (50ºC). A cool location is preferable. Keep this unit within the 15' (4.5M) reach of the wires from main feed pump module. This unit may be placed as high in the boat as you desire. Make sure that the area around and under the pump does not have any water sensitive equipment. Water will be spilled during any repairs or if a leak occurs.

Membrane Pressure Vessel Mounting

The Clark Pump and membrane assembly has been pre-assembled at the factory. If it is necessary to disassemble this module and mount the pressure vessel separately, see the Membrane Pressure Vessel Relocation instructions in this manual. This part of the system runs at 800psi (55bar). Use only Spectra high pressure tubing and fittings.

Remote Control Panel

The remote control panel can be mounted anywhere that is convenient. Cut a 4-1/4" (11cm) wide by 4-3/4" (12cm) high opening for the panel. Locate it in a protected area where it will be easy to read the gauges and operate the buttons.
The panel will have both fresh and salt water tubing connections and an electrical cable.

Plumbing

From the inlet thru hull to the flush module and from the flush module to the pump module inlet, use supplied clear 3/4 (19mm) spiral suction rated hose.

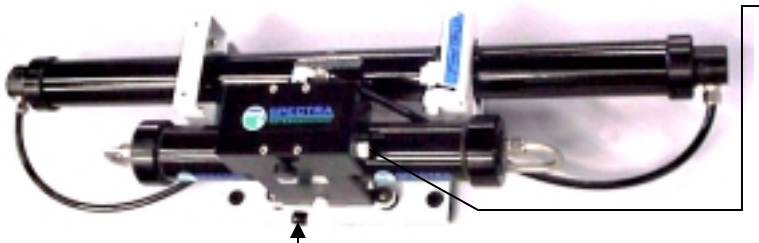
The outlet of the filter assembly on the main module to the Clark pump assembly is under pressure. Use the supplied braided clear vinyl hose rated to 150 PSI (11 bar).

From the Clark pump brine discharge connector use supplied 5/8 (15.9mm) clear braided vinyl hose.

!! Route all hoses and tubes to prevent kinks and restrictions. Secure piping away from moving objects such as engine belts and hatches. Prevent chafe on tubing as required. Test and inspect all piping and hose clamps after several hours of operation.

Salt Water Side System Piping

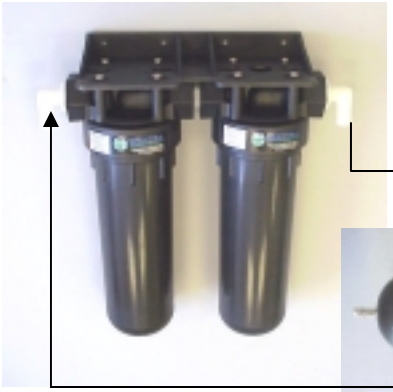
CLARK PUMP/MEMBRANE MODULE



From the Clark Pump brine discharge connector use the supplied 5/8 (15.9mm) clear braided vinyl hose to the brine overboard fitting. To prevent damage in shipping the quick disconnect is shipped attached to the module bracket. Remove either one of the pipe plugs in the valve body and screw in the connector.

The system from the Pump module to the Clark pump assembly is under pressure. Use the supplied braided clear vinyl hose rated to 150 PSI (11 bar).

PREFILTER MODULE



PRESSURE GAUGE
Use the supplied 1/4" black nylon tubing

FLUSH MODULE

From the inlet thru hull to the flush module and from the flush module to the pump module inlet use the supplied clear 3/4 (19mm) spiral suction rated hose.

PUMP MODULE

SEA STRAINER

Fresh Water Flush

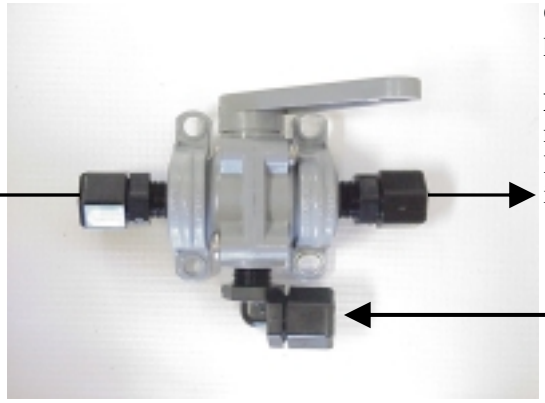
Run a feed line from the domestic cold pressure water system to the 1/2” hose barb on the fresh water flush assembly. The boat’s fresh water system must be turned on for the fresh water flush system to function properly. **The domestic fresh water pump must be able to deliver 2.5 gallons per minute at 25 psi**. Connect the flush solenoid cable by crimping and heat shrinking the butt splices. The flush water accumulator is located inside the Feed pump module and should be precharged to 5psi (0.3bar)

Product Water and Pressure Gauge Piping

Sampling Tap for discarding product at startup, testing the product water, and for service procedures.
Put enough tube on this port to reach your service (pickling) container.

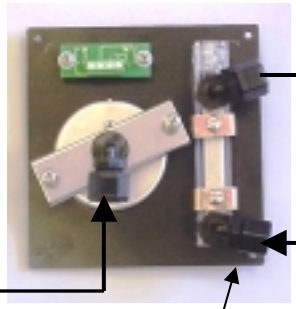
Product to tank. Route the product water from the valve into the top of the tank. Install a tee in the water fill or tap a pipe thread into an inspection port.

DO NOT! feed into a vent line, manifold or the bottom of the tank. Make sure that there is no restriction in this piping.



Product sampling valve. Mount using the supplied plastic straps as shown.
Note: the handle points in the direction of the flow.

Use accumulator port to connect the pressure gauge. Tubing must be pressure rated to 150 PSI (10 BAR) Use the supplied 1/4" black nylon tube or equivalent



Product Flow Meter

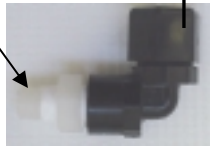
Use the supplied 1/4" black nylon tubing. For the product water tubing. If more length is needed than we supply, use a larger size hose.

Plastic fittings should have 3-4 wraps of Teflon tape and will thread almost all the way in. Leave the first pipe thread uncoated. Avoid getting dirt or debris in the system during assembly. Secure piping away from moving objects and protect from chafe. Exercise care not to cross thread the fittings. See the tube assembly instructions next page.

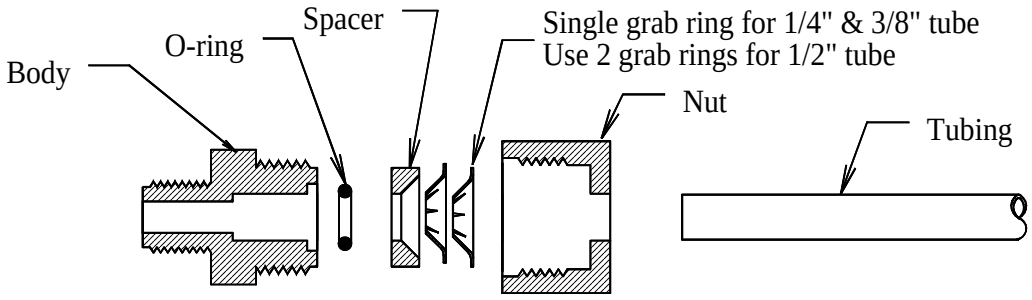
Product Ports are located here

Remove one of the 1/8 inch NPT product port plugs (from either end of the membrane housing) and thread in the product fitting with Teflon tape sealant.

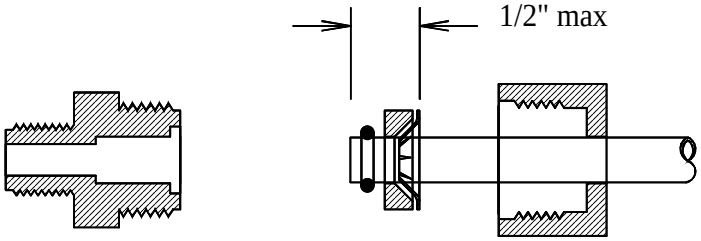
Product fitting



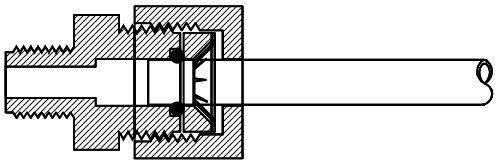
Parker Tube Fitting Assembly Procedure



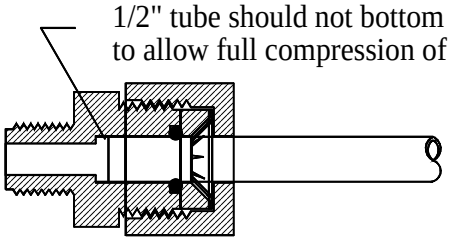
Step 1: Dissemble fitting components



Step 2: Install the Nut first then use the bevelled side of the Spacer to push the Grab Ring onto the tube no more than 1/2". Slip the O-ring over the tube to hold the Spacer in place. If the Grab Ring is pushed too far, trim back the tube so about 1/4" of tube extends past the O-ring.



Step 3: Gently fit the tube into the body and loosely thread on the nut. Be careful not to cross-thread the nut



Step 4: Hand tighten the nut. DO NOT OVER TIGHTEN! DO NOT USE A WRENCH! The tube should not come out if pulled by hand. If it does, tighten the grab ring tabs.

1/4", 3/8", 1/2" Parker Tube Fitting Assembly

Membrane Pressure Vessel Relocation

Use **ONLY** Dayco Imperial Nylo-Seal 88-NSR-1/2 tubing for high pressure connections. Pay attention to the direction and flow path of the tubing before disassembly. Make sure that you reinstall the tubing in the same manner. Rotate the 90 degree high pressure tube fittings on the Clark pump for ideal tube runs. The high pressure fittings are typically pre-installed at the factory. The fittings on the Clark pump have an O-ring seal and can be re-oriented as follows. Back out the O-ring Stop nut. Rotate the fitting to align with the tube and tighten the nut **just past hand tight. Do Not over tighten!**

Follow the high pressure tube connection instructions on the next page. Connect the tubes to one of the components, secure the tube runs, and then trim and connect to the other component. A 90 degree bend in a tube is better than a 90 degree fitting. A tube, when mounted, should have at least ***one gentle bend*** to allow for expansion. **Do not connect a tube straight between hard mounted fittings.**

Spectra High Pressure Tube Fitting Assembly

Use **ONLY** Dayco Imperial Nylo-Seal 88-NSR-1/2 tubing for high pressure connections.

Carefully fit and measure the tubing before cutting with a sharp razor knife or hose cutter and remove any burrs. Minimum tubing bend radius is 6". Route tubing away from excessive heat sources and secure from vibration and chafe. Have at least one shallow bend in a tube assembly after it is installed.

Refer to figure 1. If a fitting has been dissembled, reassemble as illustrated. The notch on the ferrule must engage the inside of the nut properly for the nut to seat down fully. Once the tube is inserted the ferrule and nut will naturally align.

Refer to figure 2. Insert tube fully into the fitting, it should go in 0.9". Tighten the nut finger tight while moving the tube around to prevent binding. One thread should be showing under the nut. Secure the tube so it won't back out when tightening.

Refer to figure 3. Use 13/16" wrench to hold a straight body fitting or a 3/4" wrench for a 90º body, and a 7/8" wrench for the nut. Hold the body, recheck the tube insertion, then tighten the nut 1-1/4 turns. Use the index mark on the nut as a guide. The threads should be completely covered by the nut.

Make Sure these fittings are tight on initial assembly or they will fail!

The correct Torque is specification is 85 foot pounds

Figure 1.

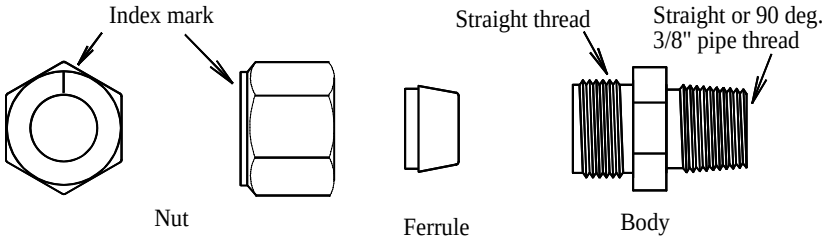


Figure 2.

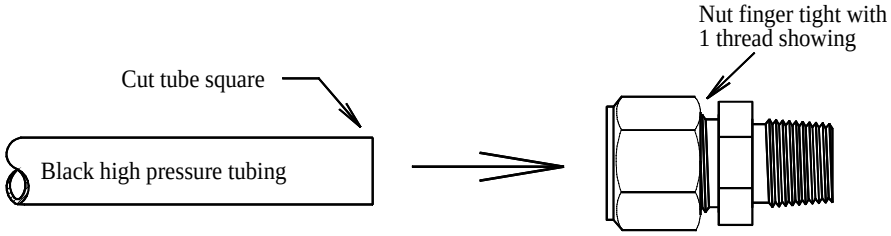
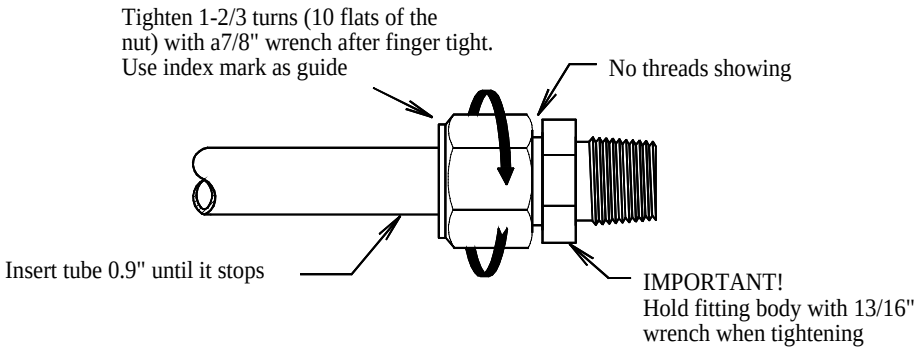
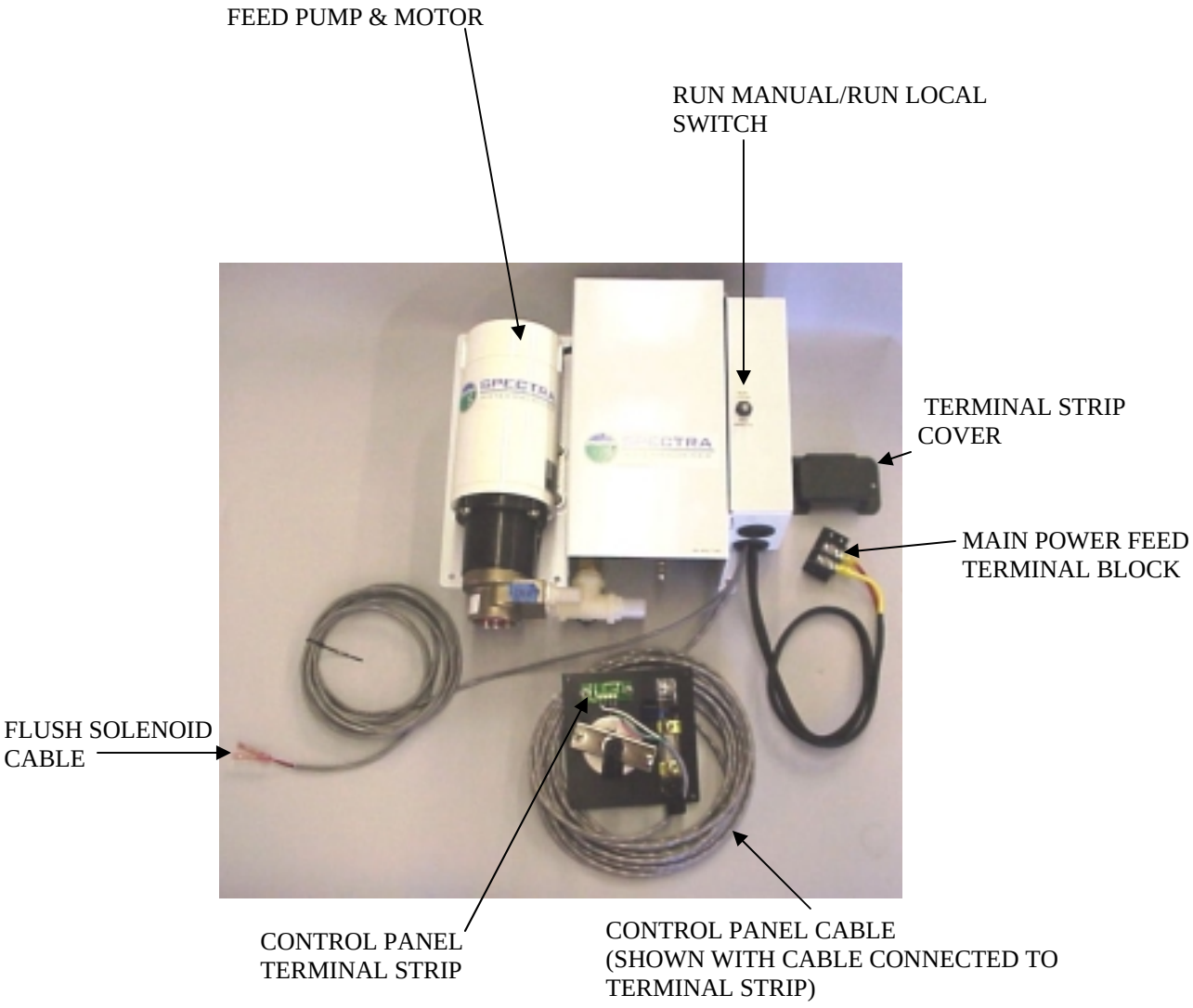


Figure 3.


Tighten 1-2/3 turns (10 flats of the
nut) with a7/8" wrench after finger tight.
Use index mark as guide
No threads showing
Insert tube 0.9" until it stops
IMPORTANT!
Hold fitting body with 13/16"
wrench when tightening

CATALINA DELUXE WIRING


FEED PUMP & MOTOR
RUN MANUAL/RUN LOCAL SWITCH
TERMINAL STRIP COVER
MAIN POWER FEED TERMINAL BLOCK
FLUSH SOLENOID CABLE
CONTROL PANEL TERMINAL STRIP
CONTROL PANEL CABLE (SHOWN WITH CABLE CONNECTED TO TERMINAL STRIP)

Wiring

Mount the main power feed terminal block on a bulkhead adjacent to the feed pump module. Make sure that this is a dry location well above bilge level and not subject to water spray. Check the wire size chart to select the proper size power feed wires, and run the cables from the breaker to the main power harness. Install the cover.

Route the Flush solenoid cable to the fresh water flush module and splice the wires to the solenoid wires. There is no polarity to the wires. Heat the splice for sealing.

Connect the control cable to the Control Panel terminal strip. The terminals are marked **W, B, G,** & **R** to correspond with the **W**hite, **B**lack, **G**reen, & **R**ed wires in the cable.

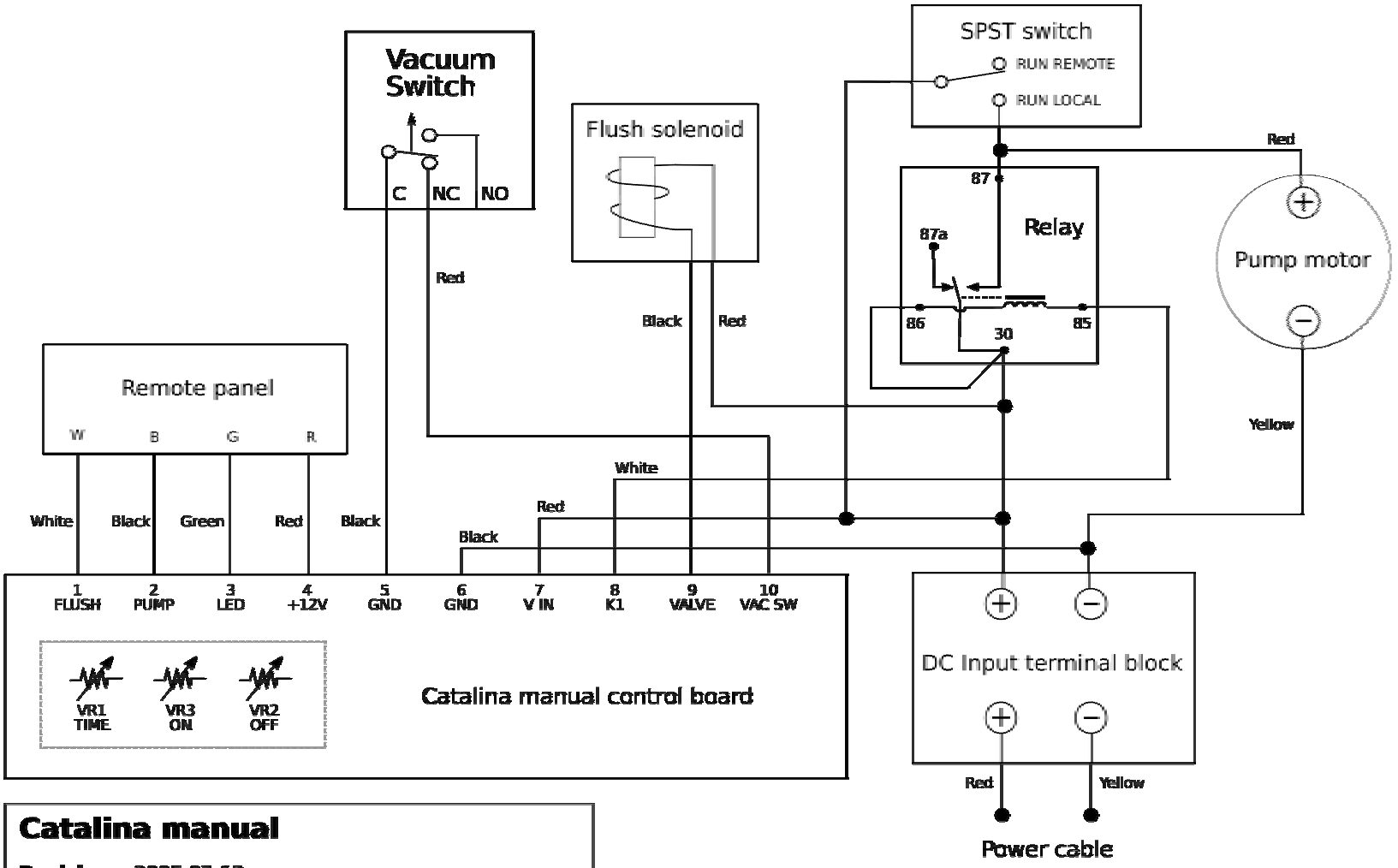
Component Sizing:

- 12V: Use a 25 Amp breaker and size the wiring for 20 Amperes.
- 24V: Use a 15 Amp breaker and size the wire for 10 Amperes.

Note: If the specified circuit breaker sizes are unavailable use the next higher rating but do not exceed the specification by more then 10%. All wiring to be done to applicable ABYC, Marine UL or CE standards.

Catalina Power Feed Wire Size Chart

12 volt Wire Length: FT	Meters	AWG.	SQ MM
10	3	10	6
15	5	8	10
20	6	6	16
25	8	4	25
30	9	4	25
35	11	4	25
45	14	2	35
50	15	2	35
24V Wire Length FT	**Meters**	**AWG.**	**SQ MM**
10	3	12	4
15	5	10	6
20	6	8	10
25	8	8	10
30	9	8	10
35	11	6	16
40	12	6	16
45	14	6	16
50	15	4	25



Catalina manual

Revision: 2005-07-13

Date	Description
9 June 2005	Added connection dot to red flush wire
13 July 2005	Changed vacuum switch symbol, Added control board pots, Changed switch symbol, cleaned up wiring

Spectra Watermakers

New System Start-Up and Testing

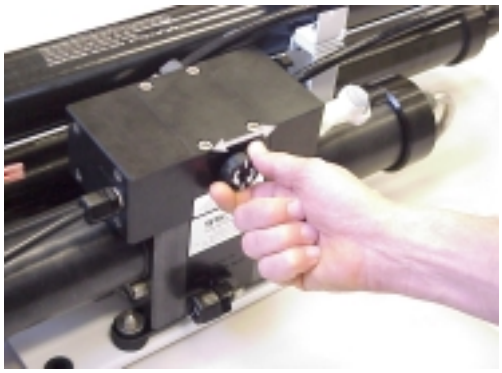
Avoid running the system if the vessel is in contaminated water, such as in a harbor or canal. The system should be fully run tested before leaving port. It is preferable to sacrifice a filter by running the system in turbid water rather than waiting to get offshore to discover a problem or deficiency in the installation. If the location or weather prevents proper testing refer to the section "Dry Testing."

Warning! Damage may occur if the purge sequence is bypassed and the membrane is pressurized with storage chemical in it.

1. First Check That:

   - **Thru-hull valve is open**
   - **Local/Remote Switch is in "Remote" position**
   - The boat's **Pressure Water system is ON**
   - **Charcoal filter is Installed**
   - Three way **product valve is set to Sample**, diverting the product water away from the

2. **! Remove the warning tag and rubber spacer** from under the pressure relief valve knob and make sure the **pressure relief valve is open 1/2 turn**.



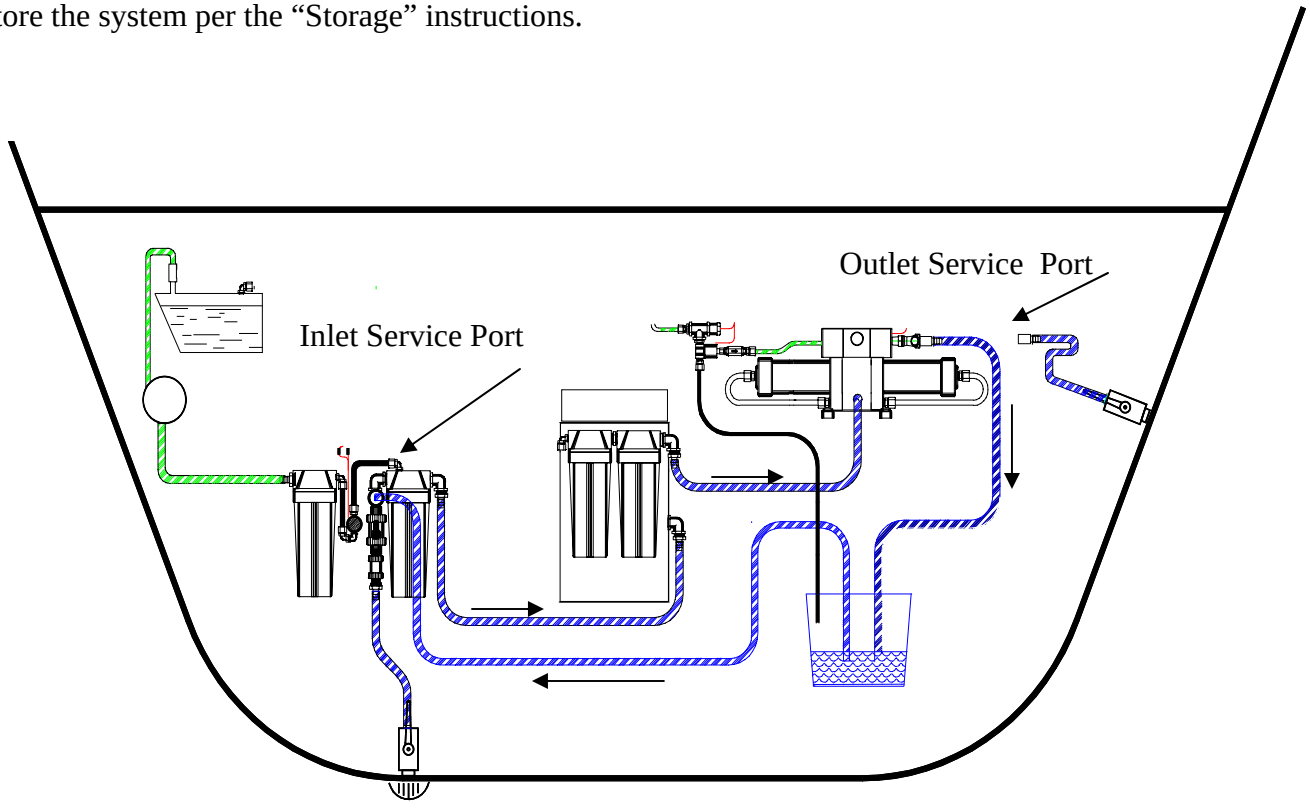
3. **Power up** the system
4. **Press the Flush button** on the remote panel. The feed pump will come on intermittently and the flush valve will open, Priming the pump. When water begins to come out the brine overboard thruhull, **Press the Flush Button** again to end the flush cycle.
5. **Press the Start/Stop button** to start the watermaker. The feed pump will come on continuously. Run the watermaker for 20 minutes with the pressure relief valve open to Purge the storage chemicals out of the membrane.
6. **After 20 minutes, close the pressure relief valve.** Product water will begin to flow from the Sampling port. The flow meter should show about 12 gph, and the pressure gauge about 80psi spiking to about 90. (Pressures will be lower in brackish water). Check to see that the pressures are the same on each cycle. **Check for leaks.**
7. After 10 minutes, **check the flow meter for air bubbles** in the product. If there is air in the product after a few minutes operation, you have an air leak in the suction side plumbing. **Sample the product** water with your handheld meter. If the water tastes good and the salinity is less than 500 ppm you can **turn the sampling valve to the run position** and begin filling your tank.
8. When finished making water **perform a fresh water flush** according to the "Automatic Fresh Water Flush Cycle" Instructions and **test the brine overboard water** at the end of the flush cycle to insure that the water remaining in the machine is **below 1000ppm salinity.** (doesn't taste salty). The feed pump and membrane will be damaged if allowed to sit idle while full of salt or brackish water. If necessary the factory flush settings can be changed, See "Catalina 300 Flush Timer Adjustment Instructions."

Dry Testing With Artificial Ocean

If it is not possible to test run the system with the boat in the water, testing may be accomplished with an artificial ocean. Purchase enough aquarium salts to make 5 gallons (20 liters) of salt water. Restaurant salt can be used if necessary.

Make sure that the domestic water system is powered up and that there is at least 30 gallons (120liters) of water in the tank. Confirm that the Charcoal filter is installed in the Fresh water flush module and that the domestic water line had been installed and all valves are open.

1. **Open Pressure Relief Valve** on the Clark Pump.
2. **Power up** the control system.
4. Press the Flush button and allow the fresh water flush system to cycle through its timed operation. **Cycle the auto store system 5 or more times** to purge all of the storage chemicals out of the system (20 minutes total purging).
5. **Hook up your service hoses** per the service diagram and photos. Route them into a 5 gallon (20 Liter) bucket. Set the diversion valve to the "Sample" position and route the product water into the test bucket.
6. Turn the valve on the fresh water flush module from "**Run"** to **"Service.**"
7. Press "Flush" one or two more times to get enough water into the bucket to properly mix your salt water. Mix the salt until it goes into solution. Mix in 30 grams of salt per liter of water. If you are using a hydrometer, mix the water to be 30,000 PPM. Close the pressure relief valve and start the system using the "Start/Stop" button or "Run Local" Switch.
8. Run and test the system for as long as possible. During the run test carefully inspect for leaks. **Check all of the system parameters** to make sure the system is operating correctly. (See previous page). Do not allow the water in the bucket to get above 120F (50C).
9. **Stop the watermaker** using the Start/Stop Button or Run Local Switch. **Allow the feed pressure to drop below 40 psi** before Initiating a flush or restarting the unit.
10. Store the system per the "Storage" instructions.



Adjust Fresh Water Flush Cycle

The Catalina 300 Deluxe Model is equipped with an automatic flush cycle which takes fresh water from the boat's pressure water system, filters it through a charcoal filter to remove any damaging chemicals such as chlorine, and pumps the filtered fresh water throughout the system to prevent biological growth and corrosion. The flush timing is factory preset to default values. **Each installation will vary and the installer should check and adjust the timing** to ensure that the water remaining in the system after the flush cycle is salt free while reducing the water used to a minimum.

- When flushing the watermaker immediately after making water, be sure to **Stop the Watermaker** and **ALLOW THE FEED PRESSURE GAUGE TO DROP BELOW 40PSI** before pushing the flush button. **Press the Flush button** to start the flush cycle. The feed pump will come on intermittently and the flush solenoid valve will open. The flush will continue for a preset period and shut off automatically.

CATALINA 300 FLUSH TIMER ADJUSTMENT INSTRUCTIONS

The **Catalina 300 Deluxe** watermaker is equipped with a timing circuit which controls the length of the fresh water flush cycle and the pump on and off timing. Because the feed pump has only a single speed, and the flow rate at this speed exceeds the flow capacity of the charcoal flush water filter, the pump is pulsed on and off during the flush to limit the flush water flow to the approximately 1.5 gpm filter capacity. The flush timer activates the flush solenoid valve continuously during the length of the flush cycle. The flush module accumulator is used to even out the flow through the filter. When the pump is running it draws water from both the accumulator and the charcoal filter. When the pump is off water continues to flow from the boat's pressure water system through the charcoal filter and refills the accumulator. The accumulator should be pre-charged to about 5psi (1/2bar). The Flush timer circuit board also has as a safety shutdown circuit in case the vacuum switch senses a restriction in the suction lines, causing the switch to open.

WIRING: On the outside of the flush timer box is a Run Local/Run Remote switch. Inside the box are the Motor Relay, the Flush Timer Circuit Board (pcb), and a terminal strip. Power Input, Control Panel, and Flush Valve Solenoid cables are pre-wired at the factory and need only be connected to the appropriate component. The solenoid valve wires have no polarity. The vacuum switch cable must be wired to the Normally Closed (NC) and Common (C) terminals of the Vacuum switch and to terminals 7 & 10 on the circuit board. The Feed Pump Negative (yellow), and Earth ground (green), leads should be connected directly to the Negative (Yellow) terminal on the terminal strip. The Motor Positive (red) lead goes to the multi stack push-on terminal on the Bosch relay (Terminal 87).

FLUSH TIMER ADJUSTMENT (cont): Flush timing is adjusted using the three potentiometers on the pcb.
VR1 (TIME) controls the total fresh water flush duration. Factory default: 5 minutes
VR3 (ON) controls the length of time the pump runs during each pulse. Default: 3 sec.
VR2 (OFF) controls the amount of time between pulses. Factory default: 6 seconds.
Turning the pots clockwise increases the time.

Optimum flush timing is adjusted so that no sea water is drawn in during the flush and the flush ends just as the water going overboard drops to 1000ppm or quits tasting salty. Close the sea cock. Push the flush button. Shorten the pump on time and / or lengthen the pump off time so that the vacuum switch does not interrupt the flush. If the vacuum switch opens this indicates that sea water would be drawn in if the sea cock were open.

When the ON/OFF timing is optimized so that only fresh water is being drawn into the system, shorten the flush duration as much as possible while insuring that all sea water has been flushed out and only fresh water remains in the system.

During a routine flush the seacock and pressure relief valves can remain in the operating position.

Operation

If the system contains preservative or cleaning chemicals follow the directions for New System Startup or Membrane damage will occur!

- **Never let the system sit with salt water in it.** To avoid unnecessary consumption of flush water, run the system for longer periods less frequently.
- **Air in the feed water will damage the feed pump.** Check for air in the filters and lines and fix air leaks promptly. If air may have gotten into the system due to filter changes or rough weather, open the pressure relief before startup.

Normal Operation: **Set the sampling valve to the Sample position. Press the Start/ Stop Button.** If the pressure relief valve is open allow the system to run until any air is cleared from the system. **Close the pressure relief valve**. The system will begin to make water. After about two minutes taste or sample the product water. If it is acceptable **Turn the sampling valve** to send water to the tank. **Note the Pressure Gauge Reading.** As the prefilters begin to plug up the pressure reading will rise. If the pressure rises more than 5 psi (.5 bar) stop the machine and change the filters.
Note: The operating pressure will vary with sea temperature and salt content. Check the "Clean Filter Operating Pressure" each time you change the filters, and when moving to areas with different water conditions.

If the machine must be stopped for any reason do not restart it until the feed pressure has dropped below 40 psi. The feed pump is equipped with a magnetic drive coupling which will decouple and slip if started under load. Excessive decoupling will damage the magnets.

Normal Shut Down: Make sure the boat's pressure water system is energized. **Press the Start/Stop button.** The watermaker will stop. **Allow the feed pressure to drop below 40 psi** to prevent decoupling. After the feed pressure has dropped **Press the Flush Button.** The feed pump will begin to cycle on and off, and the flush valve will open. After the preset flush period is over the Unit will shutdown. **Flush the system every five days,** if it is not used to make water, to prevent membrane and feed pump damage.

Manual Operation: The system can be operated locally from the feed pump module by setting the Run Local/Run Remote Switch to Local. Whenever there is power to the unit and the switch is in the Run Local position the Feed Pump will run. Operate the system as you would in Auto operation.

Manual Flush: The system can be flushed using the Run Local switch as follows. Before shutting down, use the sampling valve to **make several gallons of product into a clean container. Connect the service hose** to the service fitting and **set the service valve to Service. Start the feed pump** and let it run until the water is almost gone. **Stop the feed pump before it sucks air.** Reset the service valve to Run and the system will be ready for the next use.

Maintenance

General

Periodically inspect the entire system for leakage and chafe on the tubing and hoses. **Repair any leaks as soon as possible.** Check for corrosion around the stainless steel fittings. If any rust appears, remove, clean, and reassemble the fitting. Rust is a sign of crevice corrosion inside the fitting and must be dealt with promptly.
Some salt crystal formation around the Clark Bump blocks is normal. Wash down any salt encrusted areas with a damp cloth. Keep the watermaker clean, dry, and salt free.

The Seawater Strainer and 50 Micron Filter

- The sea water strainer's stainless steel element should be inspected, removed, and cleaned as needed. A clogged strainer or 50 Micron filter will cause the controls to shut down the watermaker. **Avoid letting the 50 micron get so dirty the unit shuts down automatically.**
- Be careful to ensure that the thru-hull is closed before disassembly and the seal and element are in place before reassembly. Put the screen up to a light for inspection.
- When the system is put into storage, remove, rinse, and reassemble dry to impede corrosion. Check frequently during operation.
- The 50 micron filter must be properly maintained to protect the feed pump. Use only Spectra approved filters. These may be cleaned several times before discarding.

The Prefilters

- Service the prefilters frequently. As the prefilters get dirty energy consumption increases and production drops. Careful monitoring of the feed pressure gauge will allow you to see the pressure increase as the filters get dirty.

- To service the filters shut off the thru-hull, open the housings, Clean out the housing bowls, reassemble the housings with new 20 and 5 micron filter elements. The 5 micron filter goes downstream from the 20 micron. Leave dry until next startup.

- Use only Spectra approved filters or you may void your warranty. The filters may be cleaned several times with a soft brush and water in a bucket. Occasionally, lightly lube the O-rings with silicone grease.

Oil Water Separator (Optional)

To install the capability to remove oil from the feed water, replace the supplied 20 micron filter element in the duplex filter set with the optional Oil/Water Separator cartridge.

The Charcoal Fresh Water Flush Filter

- Replace the charcoal filter element at least every 6 months. The activated charcoal loses its chlorine removing qualities after six months even if it is clean. Chlorine will destroy the membrane

Long Term Storage Procedures

Watermakers are best run continuously. When not in use, biological growth in the membrane is the leading cause of membrane fouling. A warm environment will cause more growth than a cold environment. The auto fresh water flush system will greatly reduce biological growth but may not stop it completely in certain conditions. The 5 day re-flush feature allows the system to be idle without any service procedures for extended periods of time but it doesn't replace performing a storage procedure for long periods of non-use. If an optional “Z-Guard” water treatment system is installed in the system, the 5 day re-flush will maintain the system as long as unchlorinated pressurized fresh water is provided.

System Storage or “Pickling”

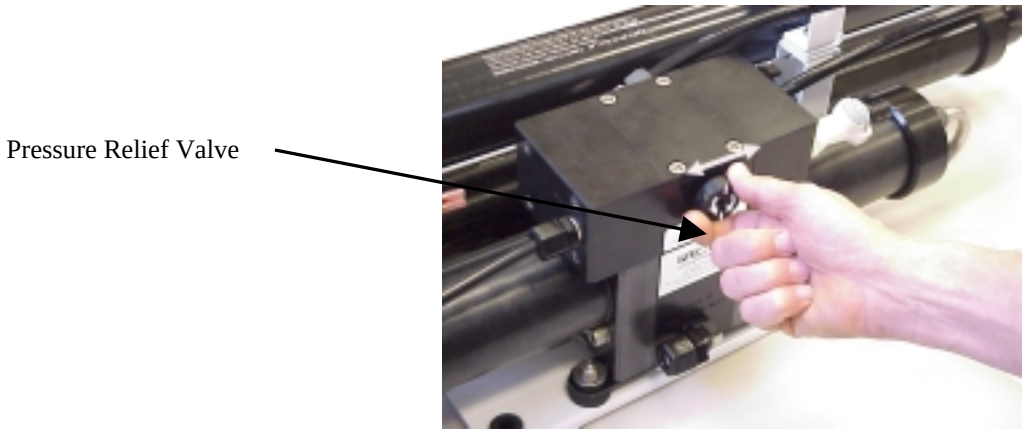
If the system is to be left unused for more than 2 weeks, perform the following storage procedure. The procedure introduces a chemical compound into the system that prevents biological growth. This procedure requires de-chlorinated water which can be made with the Spectra’s charcoal filter. **Charcoal filters last a maximum of 6 months once wetted.**

Spectra SC-1 a special storage compound also used by the US Navy. It is formulated to be compatible with the modern engineered plastics and composites in the Spectra pumps. Do not use any substitute except propylene Glycol. SC-1 Storage Compound has to be mixed at a ratio of 1 Spectra container to 3 gallons (12L) of fresh water to have the proper solution. An average of 2 gallons (8L) of water is in a Catalina system. This water has to be figured in to the mixture. A Catalina system uses one SC-1 container.

Caution! Avoid contact with skin, eyes, or lungs with the storage chemical.

Catalina Storage Procedure

1. **Perform a fresh water flush** as described in the Automatic Fresh Water Flush Instructions section.
2. **Remove the quick disconnect fitting** from the brine discharge outlet of the Clark pump, and **replace with the quick disconnect hose** from your service kit. Lead the hose to a 5 gallon bucket or container.
3. **Push Flush** to run the feed pump until you have one gallon of fresh water in the bucket, then **push Flush again** to end the flush cycle.
4. **Mix 1 container of SC-1 storage compound** with the water in the bucket.
5. **Connect the inlet service hose**, using the garden hose barb fitting from your service kit, to the service port of the fresh water flush module. Lead the hose into the bucket. Turn the service valve on the fresh water flush module 180°, so the intake is now coming from the bucket.
6. **Make sure the pressure relief valve on the Clark pump is <u>Open</u> (unpressurized) by turning 1/2 turn counterclockwise**



7. Turn on the feed pump with the Start/Stop Button or the Run Local Switch. Circulate the storage chemical in the system for approximately 10 minutes. Turn off the feed pump when finished.

Clean Up

Remove the quick disconnect from the Clark pump brine discharge, and replace the original hose that leads to the thru-hull. You may at this point, if you choose to, pump the bucket dry by using the Local/Remote switch. Stop when the bucket is nearly empty.

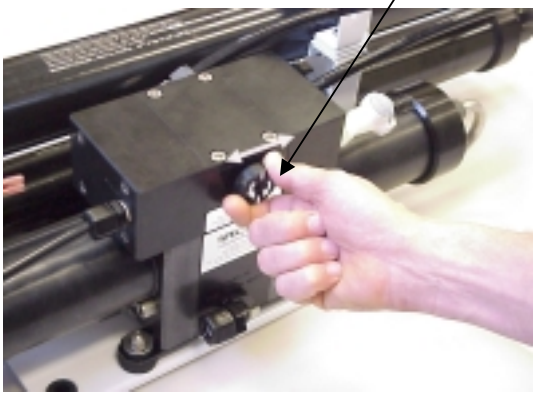
Turn the service valve 180° back to its original position, and remove the service hose.
Close the seacock and drain and clean the strainer and any filters in the system. Reassemble dry.

Storage & Winterizing

Warning! Use only potable water antifreeze (Propylene Glycol).
Do not use automotive antifreeze (Ethylene Glycol).

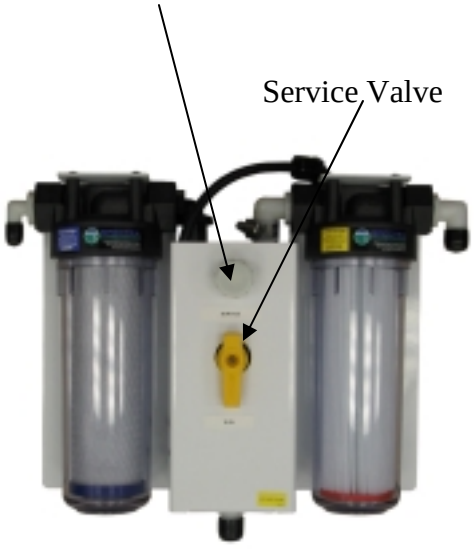
1. **Flush the system with fresh water** according to the Automatic Fresh Water Flush Instructions.
2. **Connect your inlet service hose** and place it in your service container or bucket.
3. **Turn the service valve** to the service position.
4. **Pour 2 gallon (8L) of Propylene Glycol –100 Antifreeze** in the bucket.
5. **Make sure that the pressure relief valve is open** (un-pressurized).
6. **Turn on the Feed Pump** until antifreeze begins to appear at the brine discharge. **Stop the Pump.**
7. Disconnect the Brine Overboard hose and **Connect the Brine Service Hose.** Place the end of the brine Service Hose in the bucket.
8. **Turn on the feed pump** and re-circulate the antifreeze for 20 minutes.
9. Stop the pump. Reconnect the brine discharge hose. Restart the pump until the bucket is empty.
10. Close the seawater intake and the service valve. Drain the strainer and the hose leading to the inlet module. Disconnect the product tubing and blow any residual water out of the tubing with compressed air.

Open the pressure relief valve



Inlet Service Hose Connection

Service Valve



Connecting the brine discharge hoses

The Membrane

- Membranes need to be cleaned only when feed pressures have risen 10% due to fouling or the product quality degrades. The leading cause of fouling is from biological growth that occurs when the system is left unused without flushing or pickling. Fouling from mineral scaling can happen during operation under certain sea water conditions, and from rust. Monitor the product salinity and feed pressure bar graphs for higher than normal readings for the conditions. Other conditions that can cause high pressure are cold feed water, high salinity feed water and clogged filters. Low product flow is more likely to be due to low voltage, or poor feed or Clark pump performance . Look for all other causes before cleaning the membrane. Membrane life will be shortened by excessive cleaning.

- There are two types of cleaners: acid and alkaline. The acid cleaner (SC-3) will remove mineral scaling. The alkaline cleaner (SC-2) is used to remove biological by-products, oil, and dirt particles that get past the prefilters. If membrane performance is reduced and they have not been pickled recently, cleaning with both chemicals is recommended. The acid cleaner should be used first. If the membrane fails to respond to both cleanings, this is an indication of another problem with the system, or that it is time to replace the membrane. Contact Spectra Watermakers before removing a membrane.

Membrane Cleaning

For normal cleaning, the SC-3 Acid Cleaning Compound is used first, then the SC-2 Alkaline Cleaning Compound. If known bio-fouling is present, the SC-2 may be used first. Using hot water if possible, up to 120°F (45ºC) is recommended as it greatly enhances the ability of the cleaners to do their jobs.

If the history of the system is unknown or it has been left “unpickled” for an extended length of time and biological growth is present, it is recommended that the system is cleaned with SC-2, using an alternate source of unchlorinated fresh water before the system is run under pressure. A simple test can be performed to see if biological growth has occurred. Before running the system, remove the prefilters and examine their condition If the housings are full of smelly discolored water, the system was not properly stored. Install clean prefilters if they were bad. Next check the membrane. Attach the brine discharge service hose and lead to a bucket. Open the pressure relief valve one turn, and manually run the system for 30 seconds. Examine the brine water: if it’s discolored and smells bad, perform an SC-2 cleaning with an alternate source of unchlorinated water before running the system pressurized. If the brine is fairly clean, the system can be purged, run normally, and checked for performance. Clean the membranes only if performance is reduced.

Heating the water is preferable. One way to do this is to find a camp stove and use a large stainless steel pot to heat the solution in. The cleaning solution throughout the system will heat as it circulates in and out of the pot. An alternative is to heat the one or two gallons of initial water to 120° on the main stove before mixing in the cleaner and circulating it into the system. Periodically stop and reheat the solution.

Perform the cleaning procedures while the ship is in acceptable sea water for purging and testing.

Note: Procedures are the same for the SC-2 and SC-3 cleaners

Warning! The pressure relief valve on the Clark pump must be open for this procedure or membrane damage may result. Maximum pressure 50 psi.

Spectra Cleaning Compound (SC-2 or SC-3) must be mixed with fresh water at a ratio of 1 container of compound to 3 gallons (12L) of unchlorinated water to have the proper solution. An average of two gallons (8L) of water is already present inside a Catalina system. This water has to be figured into the mixture. A 300 system will use 1 container of compound. SC-2 and SC-3 are never mixed together. Do not use them for storage pickling solution.

Cleaning Procedure:

- Step 1: Flush the system twice. Use the " Flush" button on the Panel. When the first flush has been completed press " Flush" again.

- Step 2: Remove the quick disconnect fitting from the brine discharge outlet of the Clark pump, and replace with a quick disconnect from your service kit, fitted to a hose, and lead the hose to a 5 gallon bucket.

- Step 3: Press "Flush" again to fill the bucket with 1 gallon (4L) of fresh unchlorinated water. Press "Flush" again to stop the flush cycle when the bucket has reached the desired level.

- Step 4: Connect a hose, using the garden hose barb fitting from your service kit, to the service port of the fresh water flush module. Lead the hose into the bucket. Turn the service valve on the fresh water flush module 180°, so the intake is now coming from the bucket.

- Step 5: Mix the cleaning chemical compound into the water in the bucket.

- **Step 6: Make sure the pressure relief valve on the Clark pump is <u>Open</u>** (unpressurized).

- Step 7: Use the "Run Local" switch to turn on the feed pump. Circulate the storage chemical in the system for approximately 25 minutes. Turn off the switch when finished. Allow to soak for several hours or overnight if the solution is cold, running the pump occasionally to agitate the solution. **Set the switch to "Remote"** when finished.

- Step 8: Replace the brine overboard hose. Remove the Inlet Service hose and turn the Service valve to the Run position.

- Step 9: **<u>To avoid damaging the membranes, Follow the "New System Startup" Instructions</u>** to Purge the chemicals out of the System.

Suggested Spares

Short term cruising, weekends etc.

We suggest a BASIC CRUISE KIT "C". This kit consists of 3 ea: 50 micron ,20micron, and 5 micron filters, one charcoal filter, and two jars of SC-1 storage chemical.

Cruising 2 to 6 months at a time.

Two basic cruise kits, One each replacement charcoal filter element. One replacement feed pump head.

Longer than 6 months,

Additional filters, offshore cruising kit consisting of Clark pump seals, O-rings, tools and membrane cleaning chemicals. One replacement strainer screen, O-ring for strainer screen, O-rings for filter housing

Spectra Watermakers parts list:	**Part Number**
SC-1 STORAGE CHEMICAL	KIT-CHEM-SC1
SC-2 CLEANER	KIT-CHEM-SC2
SC-3 CLEANER	KIT-CHEM-SC3
BASIC CRUISE KIT C	KIT-BCK-C
5 MIC FILTER	FT-FTC-5
20 MIC FILTER	FT-FTC-20
50 MIC FILTER	FT-FTC-50
CHARCOAL FILTER	FT-FTC-CC
5" STRAINER SCREEN	FT-STN-5S
OIL/WATER FILTER	FT-FTC-OW
FEED PUMP HEAD	PL-PMP-110MAG
FEED PUMP BRUSHES	KIT-MTR-BDMBK
5" STRAINER O-RING	SO-STN-5SS
FILTER HOUSING O-RING	SO-FHS-10H
OFF SHORE KIT	KIT-OFFSH
20" MEMBRANE	FT-MB-20
40" MEMBRANE	FT-MB-40

Operation and Repair Bulletins

The following documents are sections of our complete service bulletin set. These are available on our website Spectratermakers.com

MB-2 MEMBRANE CARE

Membrane life is affected by a large number of factors and is somewhat unpredictable. A big commercial plant running 24/7 will get 10 to 12 years out of a set of membranes. But they do all kinds of fancy chemical injections and never shut the thing off. Most cruisers are lucky to get five or six years out of one. You hear of the eight or ten year old membrane now and then. The biggest killers of membranes are lack of use, chlorine damage, and improper storage.

Don't let membranes sit around with sea water or stale fresh water in them. Biological growth will occur in the membrane. Here at the factory we frequently get back membranes for inspection that reek of hydrogen sulfide (rotten eggs). This odor is produce by anaerobic bacteria that live in an unused membrane, feeding on whatever animal or vegetable matter is trapped in it from the plankton that gets through the system. Membranes badly fouled in this way can seldom be saved. These bacteria are always present but are inhibited by the oxygen in sea water while the unit is in frequent use, by scheduled fresh water flushes, or by pickling. Keeping the prefilters clean is also important in preventing bio-fouling. If your prefilters are allowed to become a breeding ground for bacteria (get smelly), the contamination will spread throughout the system. When we cut open a failed membrane we also find mildew, another form of bio fouling, probably due to long term storage with no biocide or stale biocide.

After many hours of water making mineral deposits will form and must be dissolved away with an acid cleaner. Alkaline cleaners are used for bio-fouling. Cleaning chemicals, especially the alkaline, are not good for the membrane. Every time you clean the membrane it shortens its life. Clean only when necessary, and avoid cleaning as a "diagnostic tool".

Chlorine will destroy a membrane in minutes. It attacks the material that the membrane is made from. Always use product water or water filtered slowly through a charcoal filter for flushing and chemical treatments.

Oil simply plugs up the matrix of the membrane and clogs it up. We have brought back oil fouled membranes with Joy soap (See MB-5 Cleaning with Detergent.)

For storage we recommend using propylene glycol potable water system antifreeze if available. It can safely be left in the system for one year and will keep things from freezing in cold conditions. It is hard to find in warm climates, and takes up a lot of room on a small boat, so our SC-

Given good care a membrane will eventually just start to slowly fade away. The feed pressure may rise and/or the ppm go up. Hardly ever will they just fail overnight.

MB-5 MEMBRANE CLEANING WITH DETERGENT

If the membrane has been fouled with oil it may be possible to save it by cleaning it with dish soap such as Joy. Don't use anything that may contain bleach. You will need quite a lot of chlorine free fresh water. If using shore water run it through a charcoal filter at a rate of not more than 1.5 gallons (6 liters) per minute.

Fill a bucket with fresh water and mix in a couple squirts of the detergent. Run the system de-pressurized with the watermaker drawing water from the bucket and discharging overboard. When about half the water is gone from the bucket stop the unit and let the membrane soak for a few minutes. Restart and pump the remaining solution overboard. Repeat until the discharge appears clean.

After most of the oil is cleaned out you can put the brine discharge into the bucket and run the system with the soapy water circulating as you would for the other cleaning chemicals. Rinse the system with a bucket of fresh water or the fresh water flush cycle, then flush for twenty minutes using sea water. Pressurize and test.

5/12/04

MISC-3 ACCUMULATOR PRESSURE

All Spectra Watermakers except the 700 and 1000 series are supplied with a pressure accumulator tank, p/n PL-ACC-TK, to be installed in the feed water line between the feed pump and the Clark Pump. In addition, the 300 and some 400 series also have an accumulator mounted inside the fresh water flush module or the feed pump module.

The purpose of the feed line accumulator is to reduce the spikes in the feed pressure caused by the cycling of the Clark pump. If the accumulator is not properly charged it can lead to problems with the pump pressure cutouts. The accumulators have an air valve on top similar to those found on car tires. This allows the internal air bladder of the accumulator to be pre-charged. The accumulator should be pumped up to about 65psi (4.5bar) for best results. Add air using a tire pump or air compressor. You can experiment with the exact pressure that will give the best pulsation dampening on your installation.

The purpose of the fresh water flush accumulator is to allow a steady flow of 1.5 gallons per minute of flush water through the charcoal filter. Because the feed pump on the 300 and 400 hundred series exceeds this maximum allowed flow rate, the controller turns it on and off, to reduce the overall flow rate. The accumulator gives the water flowing through the charcoal filter somewhere to go while the feed pump is cycled off. The flush water accumulator should be preloaded to 5 psi (.35bar).

9/27/04

OP-1 WINTERIZING OR PICKLING W/ ANTIFREEZE

WARNING: Use only propylene glycol based drinking water system antifreeze. Do not use ethylene glycol based automotive antifreeze, which is toxic.

Propylene glycol can be used instead of Spectra SC-1 storage chemical for storage in any climate up to one year following this procedure.

1. Replace the prefilters with clean ones.
2 Flush the system with fresh water until the brine discharge water is below 1000 ppm or until the brine discharge does not taste salty.
3. Set up the system for pickling according to the directions for your model.
4. Place enough antifreeze in a bucket to fill your system. This will be about two gallons for a 150 or 200 model, three gallons for a 380 or 400, and larger systems will take more.
5. Run the system DEPRESSURIZED with the feed pump drawing from the bucket and the brine discharging overboard until the colored antifreeze solution begins to appear at the brine discharge then switch the brine discharge into the bucket and recycle the remaining solution until the glycol and water are completely mixed, (about ten minutes). On some models you will have to shut down the unit to switch the brine discharge into the bucket.
6. The product water side of the system will not contain antifreeze and should be protected from freezing by blowing or draining it dry if necessary.
7. Turn off power to the system, leaving the pressure relief valve open ½ turn.

OP-2 BAD SMELLING PRODUCT WATER

The reverse osmosis membrane is permeable by many gases including hydrogen sulfide, the gas that causes rotten eggs to smell the way they do. If there are bad odors in the feed water they will go through the membrane and the product water will be affected. Usually the source of the odor is from the decay of planktonic creatures trapped in the sea strainer and prefilters. These tiny oxygen loving creatures soon suffocate and die inside the prefilter housings when the unit is shut down. Once all the available oxygen is consumed, anaerobic bacteria begin to grow, causing the odor. If a unit being used frequently begins to make smelly water, it will be the prefilters that are the source of the problem. This occurs in a week or two in cold climates, but in less than one night in very warm waters like the Sea of Cortes or Red Sea. These bacteria can spread throughout the watermaker, and begin to grow on the membrane, causing poor water quality and high feed pressures.

Filling the system with fresh water after every use greatly slows this process, allowing the automated spectra units to operate with less frequent prefilter changes, but units operated for only an hour or so a day will probably need to have the filters changed due to odor before they are dirty enough to restrict water flow. Prefilters can be cleaned. We recommend that you have three sets in service, one in the unit, one set soaking overnight in a bucket of clean fresh or salt water and one set drying for the next use. After shutting down the unit remove the used prefilters and install the dry set. Leave the housings full of air until the next use. On non-automated systems, open the pressure relief when starting if there is a lot of air in the system until the air is cleared out through the brine overboard. The filters will get just as clean when soaked in sea water, but dry much faster if soaked in fresh. Given gentle handling, prefilters can be reused many times.

Bad smelling product water is usually caused by bad smelling feed water, but can also be caused by a fouled membrane if the membrane has been left unpickled. If the unit makes smelly but not salty water after a long idle period and the prefilters are new, the smell can be eliminated by running the unit unpressurized for an hour or so to flush the membrane.

Odors in the product water can also be eliminated by adding a charcoal filter in the product water line. Spectra offers a product water filter kit p/n KIT-FLT-CC.

More on this subject is available on our website at www.spectrawatermakers.com.

8/17/04

PF-1 PREFILTERS- VANE PUMP SYSTEMS

Five different filters are used on these Spectra Watermakers to make sure that no damaging foreign materials enter the system. There are four filters in the system to clean the feed water of abrasive materials while the system is in operation, and a fifth filter that prevents the entrance of chlorine during fresh water flushing.

During normal operation the feed water is filtered in two stages. First it enters a fine mesh metal sea strainer then passes through a fifty micron pleated cellulose filter. These protect the vane pump from damage due to abrasion from silt and hard shelled plankton found in the feed water. After passing through the pump the feed water enters the filter housings containing 20 and 5 micron elements. These filters remove very fine particles which could damage the Clark pump and which would shorten membrane life.

Cleaning schedules will vary widely depending on how and where the system is used. If large amounts of feed water are run through the system in a relatively short period in biologically fertile near shore waters, the prefilters will plug up, the pressure drop across the filters will rise, product production and quality will drop, and the system will sense plugged filters and give a service prefilters or check strainer alarm if so equipped. Plugged filters can be cleaned several times by soaking in a bucket, towing behind the boat at moderate speeds, or hosing them off.

When operated only an hour or two a day in inland or near shore waters, the trapped plankton will begin to decay in the filters long before the elements plug up, and the bacteria involved in the decay will cause a “rotten egg” smell in the product water. This decay will set in overnight in tropical waters, or after a week or two in high latitudes. If handled gently and changed regularly before they get too smelly, filters in this service can last through dozens of cleanings.

In crystal clear blue water conditions the filters may need to be cleaned much less frequently.

The charcoal filter used in the fresh water flush system will not plug up unless you have some incredibly dirty domestic water in your boat. About six months after installation the charcoal filter element will lose its effectiveness at removing any membrane damaging chlorine which may be present in domestic water. Charcoal filter elements must be replaced every six months if there is ANY chance that chorine could be introduced into the flush water. Charcoal filter elements cannot be cleaned.

To ensure that filter elements fit properly and remove chlorine effectively, they should be purchased at factory authorized dealers. Our element part number is FT-FTC-XX. The last two digits indicate the micron rating, e.g. FT-FTC-05 is for a 5 micron element. Charcoal elements are FT-FTC-CC.

06/03/04

PF-2 CHARCOAL FILTERS

The function of the charcoal filter element, p/n FT-FTC-CC, is to remove any chlorine in the fresh water flush water supply. It also removes any particulate matter. The charcoal filter we use removes 99.7% of the chlorine. Beware when buying other charcoal filters. If they don't specify the percentage of chlorine removed, don't use them. The cheap ones in most cases will only remove 60 or 70%. Also, there are aftermarket filters which are very close to, but not exactly, the same dimensions that will not seal properly in the housing. The membrane can only handle small amounts of chlorine for short periods without damage. The chlorine will damage the bonding agent in the membrane in a very short time. So if you skimp on the charcoal filter you will toast a $450.00 membrane on the first flush. The other factor is the flow rate that the filter can handle. Because the chlorine is deactivated by a chemical reaction with the charcoal, it must remain in contact with the charcoal for sufficient period of time for the reaction to be complete. The filter we use can handle 1.5 gallons (6 litres) per minute flow, and are good for 3000 gallons (12,000 litres) at 1.5 GPM, or six months, whichever comes first. Regardless of the flow the charcoal loses its effectiveness after six months.

7/26/04

SPECTRA
WATERMACHINES™

Z-BRANE OPERATION MANUAL

The **Z-brane** is a revolutionary product which incorporates the Z-Guard High Voltage Capacitive technology into the membrane pressure vessel. Always active, the Z-Brane creates an environment that is unfriendly to bio-film and bacteria. The Z technoalgy also assits in the prevention of scale formation on the membrane surfaces. The Z-Brane allows the system to be shut down or decommissioned for extended periods of time without chemicals or preservatives. The Z-Brane will not prevent freezing so that in cold climates Propylene Glycol is still required.

The Z-Brane system is integral with the watermaker unit and only requires continuous 12Vor 24V DC power to be operative. The installation of the Z-Brane only consists of wiring the power supply to a continuous source The Z-brane power supply can tolerate voltages between 10V and 28V DC.

Note: There is no reason to open the transformer enclosure. Do not service this unit without disconnecting the power source! There may be high voltage present.

It is recommended that the Z-Brane be connected to a discreet continuous power source. The power must be on during the time that the system is operation and during the time the Z-Brane is used for membrane storage. If the power is obtained from the MPC then the MPC must be powered up at all times during storage. This may not be desirable.

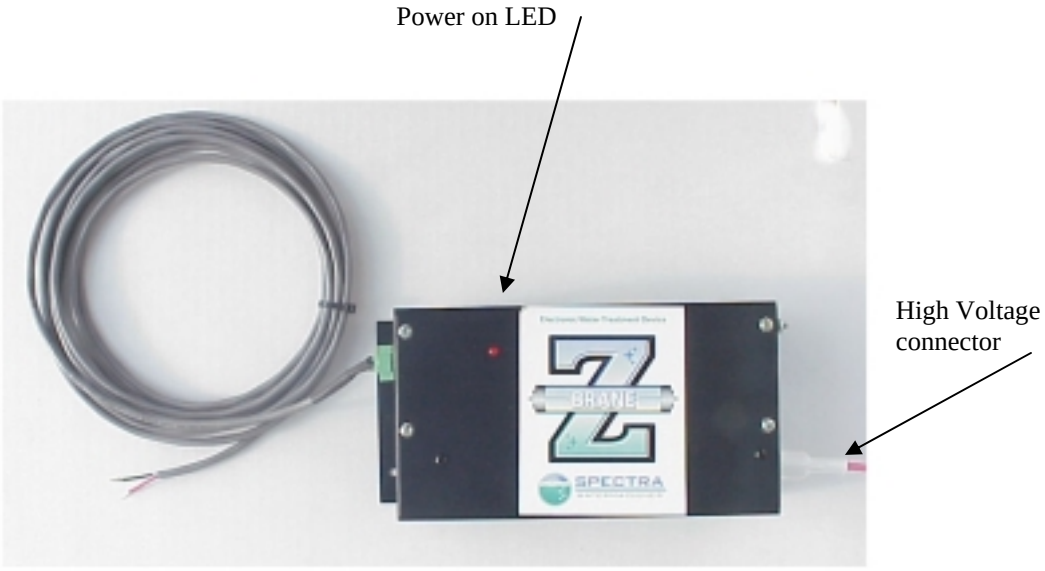
Fuse the power at the source with a 5 amp fuse or circuit breaker.
Red is Positive (+) , Black is Ground (-)

Z-Brane Power Harness

Operation

During normal operation the Red LED should be on . Power needs to be supplied to the Z-Brane unit at all times that you wish to have the biofouling and scale protection. We recommend that your watermaker be flushed after each use not only to protect the membrane but to prevent corrosion in the feed water system. To achieve full effectiveness thoroughly fresh water flush the watermaker several times before leaving the vessel.

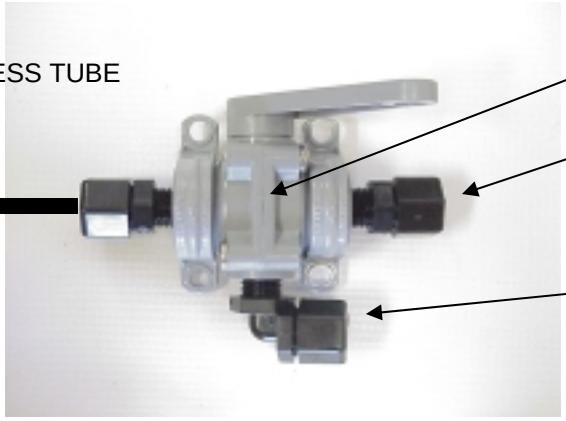
The Z-Brane may be de-powered if the system is stored with chemicals or winterized with Glycol.



DO NOT DISCONNECT
OR SPLICE ANY OF THE
HIGH VOLTAGE WIRING!

Contact the factory if
modifications are required.

CATALINA DELUXE PART NUMBERS



1/4INCH LOW PRESS TUBE
PL-NLT-1/4LP

PRODUCT WATER
SAMPLING VALVE
PL-VLV-3W1/4

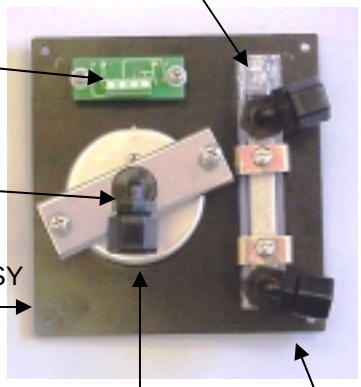
1/4 TUBE X 1/4 MPT
STRAIGHT FITTING
PL-MTS-1/4X1/4P

1/4 TUBE X 1/4 MPT EL
PL- MTE-1/4X1/4P

FLOW METER
PL-FMT-20

ACCUMULATOR
PL-ACC-TK

REMOTE SWITCH
ASSEMBLY
SUB-CT-SAM



1/2MPT X 5/8 HOSE
BARB PL-HBS-1/2X5/8

1/2" TEE
PL-TEE-1/2FN

1/2" NIPPLE
PL-NP-1/2N

1/8MPT X 1/4 TUBE EL
PL-MTE-1/8X1/4P

COMPLETE PANEL ASSY
KIT-CT-CTPAM

1/4MPT X 1/4 TUBE
STRAIGHT FITTING
PL-MTE-1/4X1/4

1/2 X 1/4 BUSHING
PL-BSH-1/2X1/4N

PRESSURE GUAGE
PL-PSG-2.5L

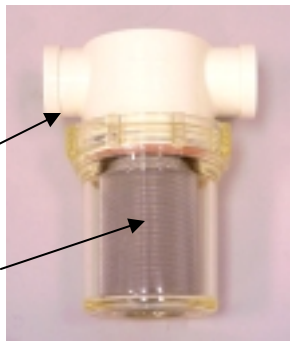
1/4FPT X 1/4 TUBE EL
PL-FTE-1/4X1/4P

5/8 IN VINYL HOSE
PL-HS-5/8VN

PREFILTER HOUSING
FT-FTH-10L

5 MICRON FILTER
CARTRIDGE
T-FTC-5F

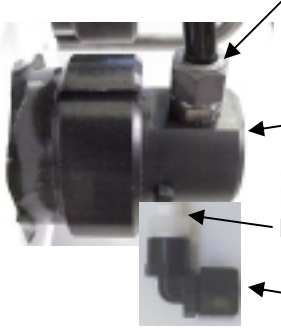
SUCTION HOSE
PL-HS-3/4SH



SEA STRAINER
FT-STN-5

STRAINER SCREEN
FT-STM-5S

CATALINA DELUXE PARTS



3/8"MALE NPTX1/2"TUBE SS FITT.ST
PL-MTS-3/8X1/2S

MEMBRANE END PLUG**FT-PV-EP**
Z-BRANE MEMBRANE END PLUG
FT-PV-ZEP (Probe end)
FT-PV-ZEPB (Ground End)

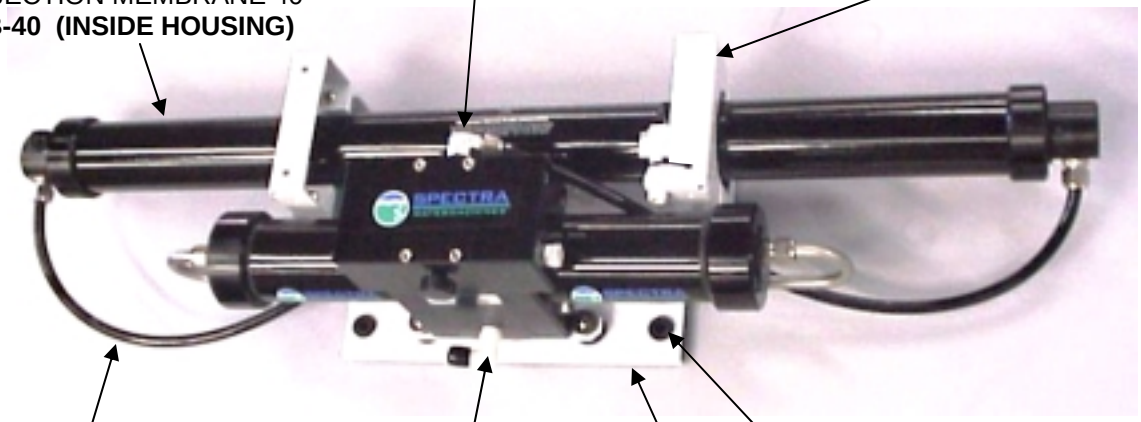
1/8"NPT NIPPLE
NYLON
PL-NP-1/8N

1/8"FEMALE NPTX1/4"TUBE FITTING
ELL
PL-FTE-1/8X1/4P

PL-MTE-3/4SX1/2
3/4"-16 X 1/2" SS TUBE FITT. ELBOW

BRACKET PLATE END
FM-PB-PBE

HI REJECTION MEMBRANE 40"
FT-MB-40 (INSIDE HOUSING)

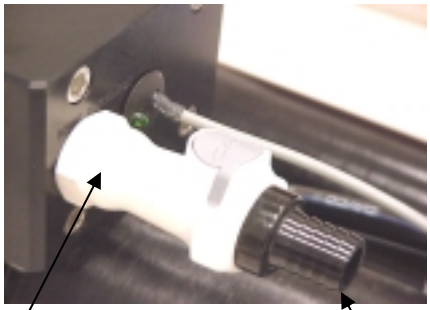


1/2" HIGH PRESSURE TUBE
(DAYCO)
PL-NLT-1/2HP

PL-HBE-3/8X5/8
NYLON HOSE BARB
ELBOW

RUBBER MOUNT
HD-RBP-RM

BRACKET PLATE **FM-PVB-PB**



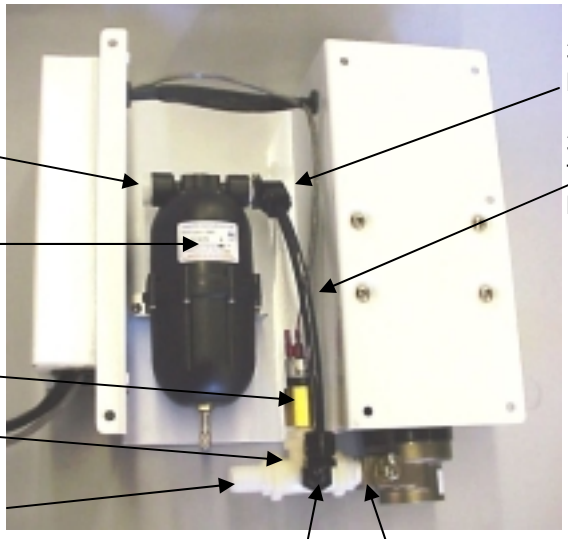
3/8"NPT QUICK DISCNT. COUP.
BODY
PL-QDC-BD3/8

5/8" QUICK DISCNT. FITT. HOSE
BARB
PL-QDC-HB5/8

CATALINA DELUXE PARTS

NOTE: LOCATED INSIDE ARE: 1. CHECK VALVE **PL-CKV-3/4F-F**
2. SOLENOID VALVE **PL-SLN1/4D12** 12 VOLT
PL-SLN1/4D24 24 VOLT

CATALINA DELUXE PARTS



3/8 NPT NYLON PLUG
PL-HP-3/8

FLUSH WATER ACCUMULATOR
PL-ACC-TK

VACUUM SWITCH
EL-SWT-VC

GUAGE TEE
PL-TEE-1/2F1/4G

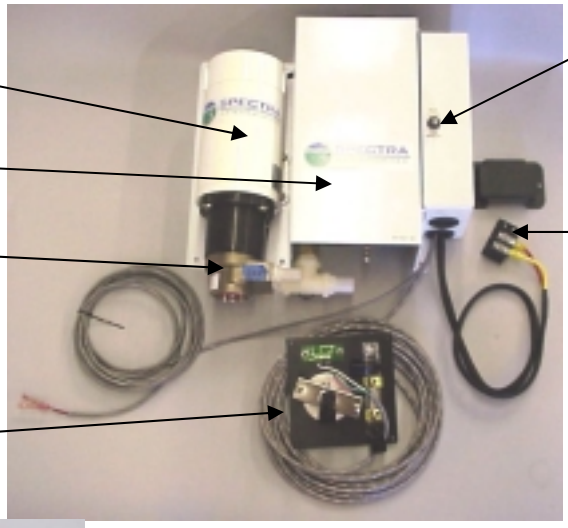
1/2NPTX3/4 HOSE BARB
PL-HBS-1/2X3/4

3/8NPTX3/8 TUBE EL
PL-MTE-3/8X3/8P

3/8 LOW PRESSURE TUBE
PL-NLT-3/8LP

1/4 NPT X 3/8 TUBE EL
PL-MTE-1/4X3/8P

REDUCING NIPPLE 1/2X3/8
PL-NP-1/2X3/8N



CATALINA MOTOR
EL-MTR-16D12

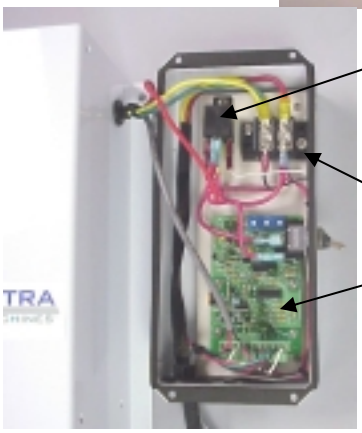
CATALINA FEED PUMP BRACKET
FM-CT-PM

CATALINA VANE PUMP
PL-PMP-110MAG

CATALINA CONTROL PANEL ASSEMBLY
KIT-CT-CTPAM

LOCAL/REMOTE SWITCH
EL-SWT-TK1

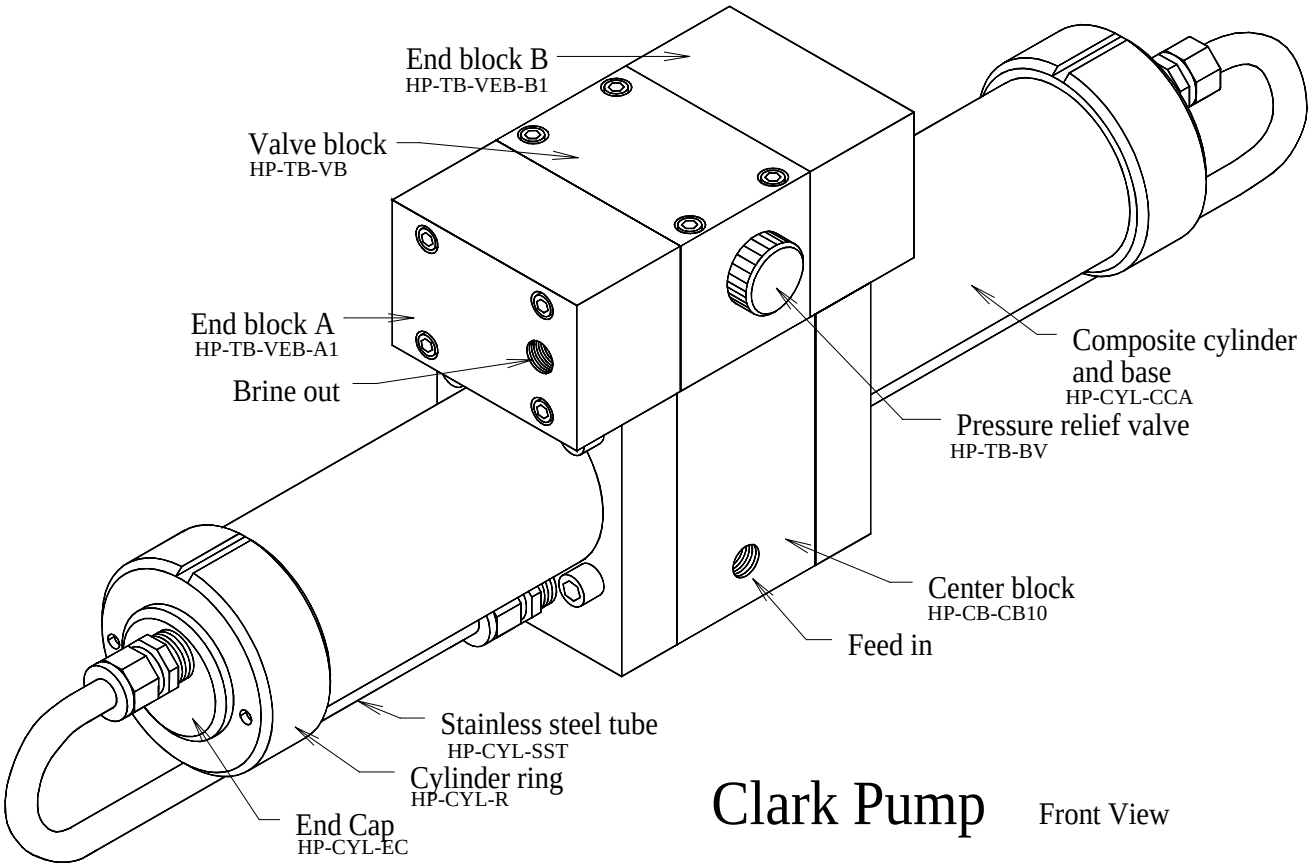
TERMINAL STRIP
EL-TM-30A2



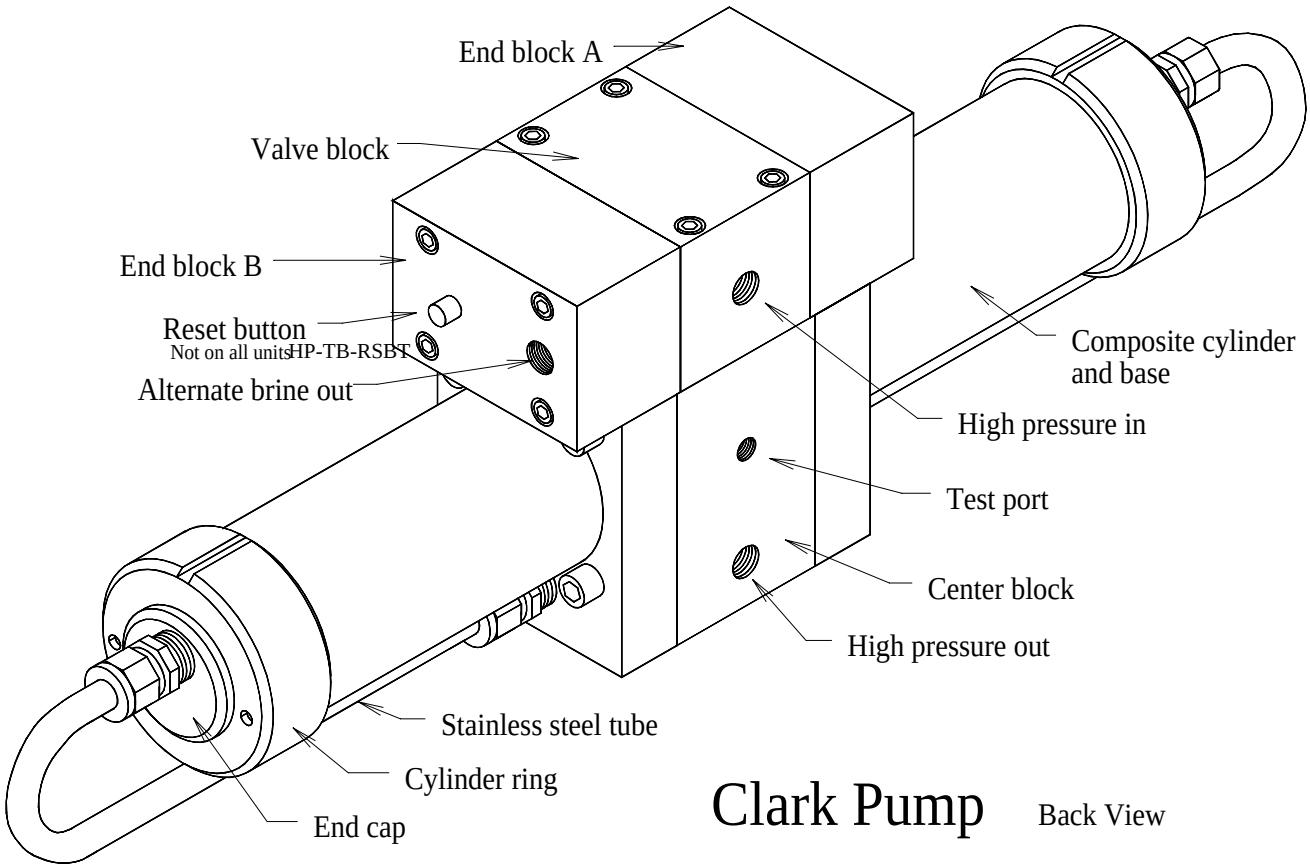
RELAY
EL-RL-40A12 (12 VOLT)
EL-RL-40A24 (24 VOLT)

TERMINAL STRIP
EL-TM-30A2

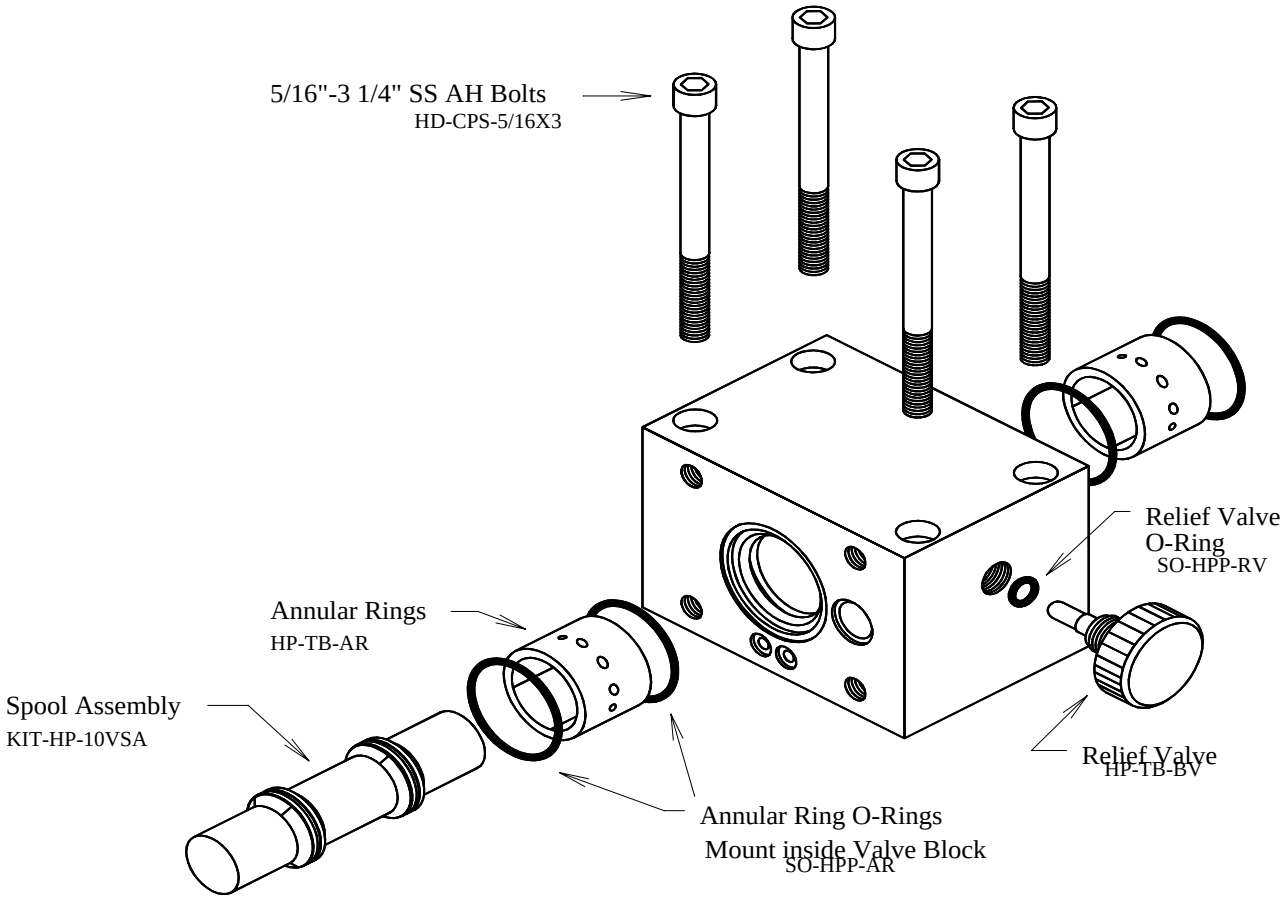
CIRCUIT BOARD
SUB-CT-CTCBA



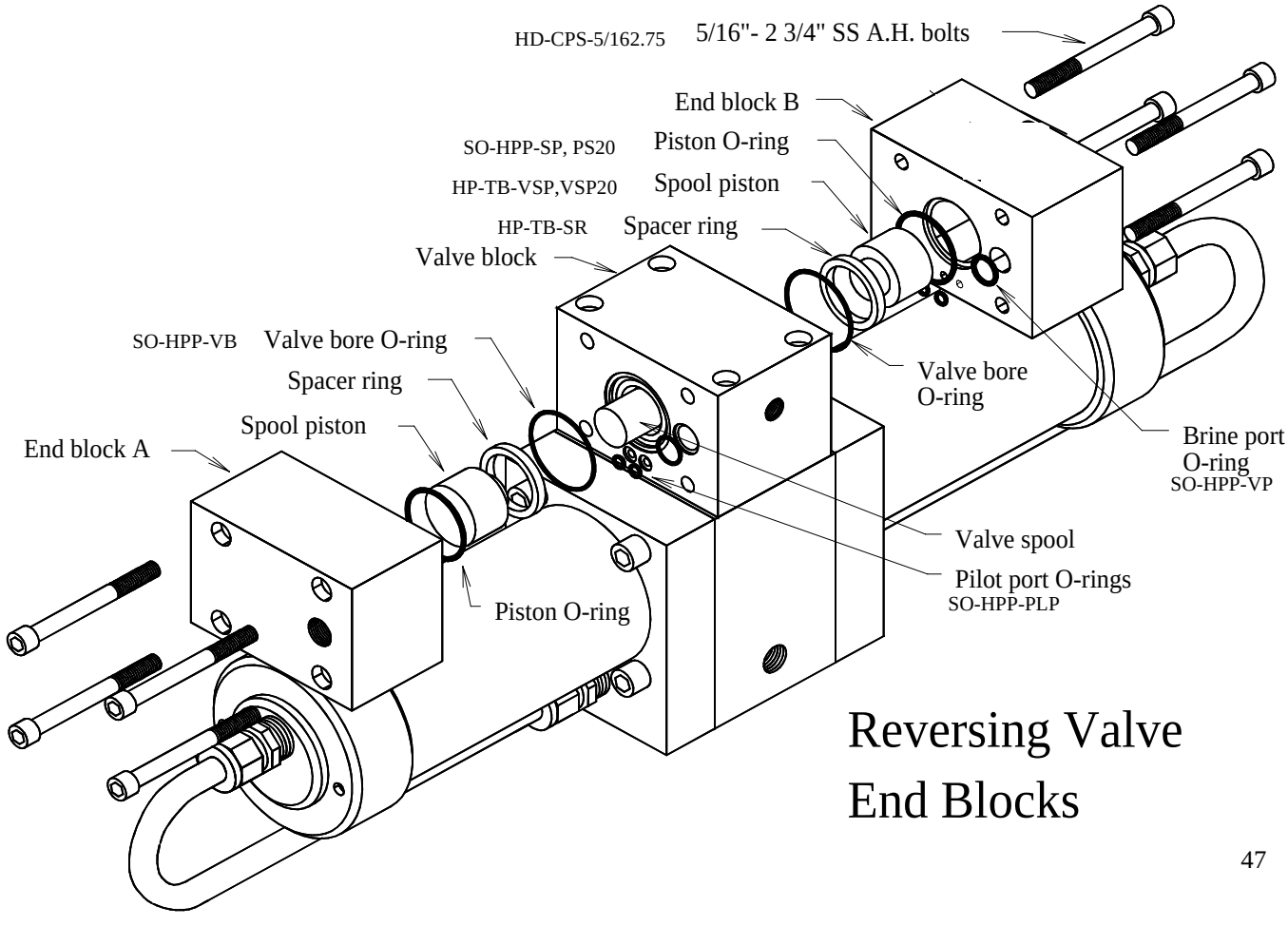
Clark Pump Front View



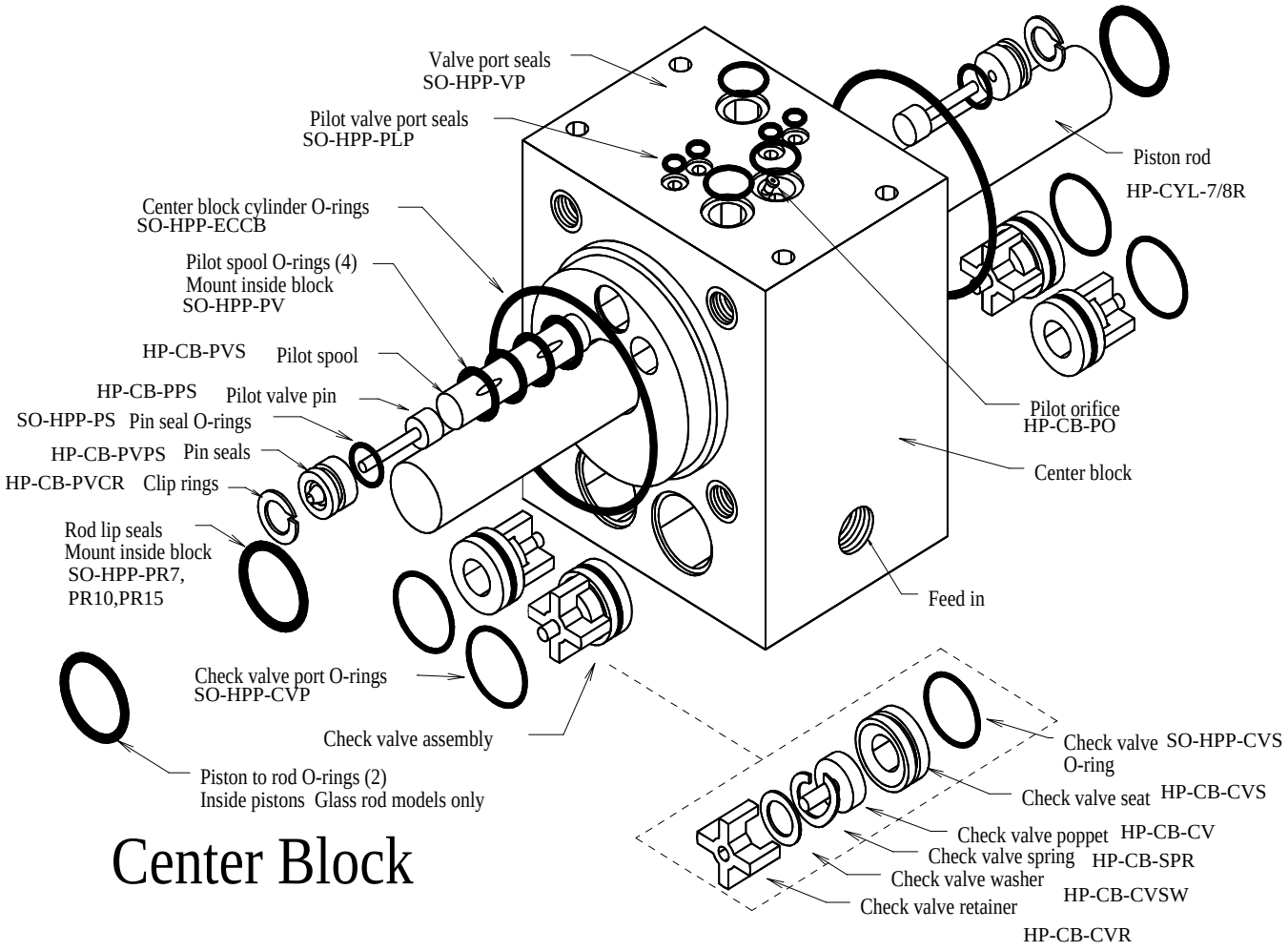
Clark Pump Back View



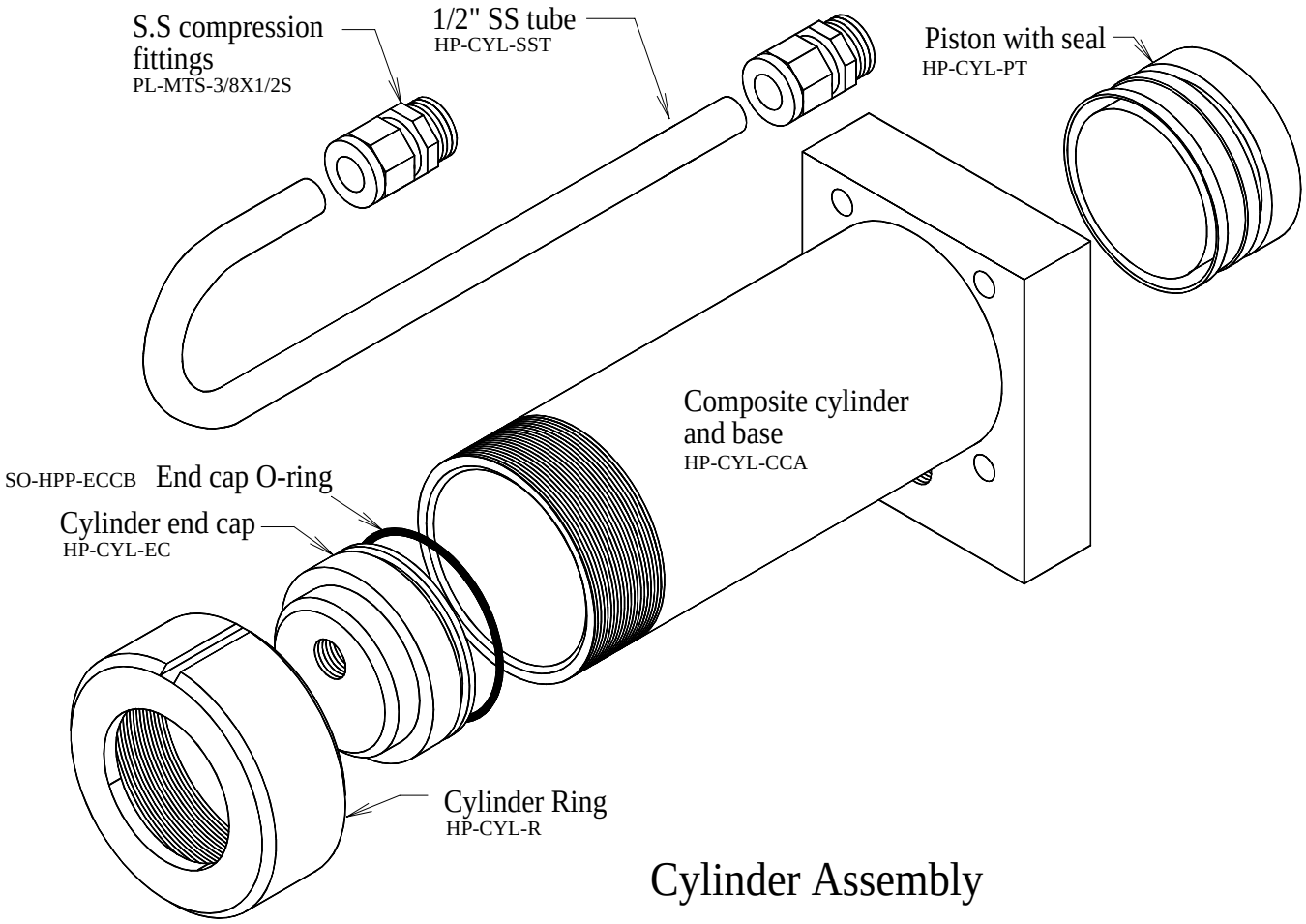
Valve Block



Reversing Valve
End Blocks



Center Block



Cylinder Assembly